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SOUTHERN MEDICAL ASSOCIATION—Sixteenth Annual Meeting, Chattanooga, Tenn., November 13-16, 1922.

TABLE OF CONTENTS

TROPICAL DISEASES AND PUBLIC HEALTH—Symposium on Malaria

Difficulties and Errors Before and After Anti-Malaria Campaigns. C. C. Bass, New Orleans, La. 339

Discussed by L. D. Fricks, Memphis, Tenn.; J. A. LePrince, Memphis, Tenn.

Malarial Relapses. H. H. Howard, New York, N. Y. 343

Necessity for and Methods of Securing Accurate Malaria Statistics in Demonstration Areas. Oscar Dowling, New Orleans, La. 347

Discussed by M. F. Maxcy, Memphis, Tenn.; J. A. LePrince, Memphis, Tenn.; George Parker, Jacksonville, Tex.; D. J. Williams, Gulfport, Miss.; Leslie C. Frank, Dallas, Tex.; L. D. Fricks, Memphis, Tenn.; C. C. Bass, New Orleans, La.; W. G. Stromquist, Memphis, Tenn.; H. R. Carter, Washington, D. C.

Problems Encountered in Maintaining Urban Malaria Control. C. W. Garrison, Little Rock, Ark. 352

Discussed by A. W. Fuchs, Memphis, Tenn.; L. D. Fricks, Memphis, Tenn.; Frank R. Shaw, New Orleans, La.; H. R. Carter, Washington, D. C.; Ennion G. Williams, Richmond, Va.; E. B. Johnson, Montgomery, Ala.; George Parker, Jacksonville, Tex.; J. A. LePrince, Memphis, Tenn.; S. W. Welch, Montgomery, Ala.

Direct and Indirect Advantages of Urban Malaria Control to State Health Program. S. W. Welch, Montgomery, Ala. 359

Discussed by E. H. Magoon, Groveton, Tex.; George Parker, Jacksonville, Tex.; E. B. Johnson, Montgomery, Ala.; Frank R. Shaw, New Orleans, La.; T. H. D. Griffitts, Norfolk, Va.; J. A. LePrince, Memphis, Tenn.

Rural Malaria Control with the County as the Unit. Ennion G. Williams, Richmond, Va. 362

Discussed by S. W. Welch, Montgomery, Ala.; H. R. Carter, Washington, D. C.; T. H. D. Griffitts, Norfolk, Va.; L. D. Fricks, Memphis, Tenn.; C. C. Bass, New Orleans, La.; C. P. Coogle, Memphis, Tenn.

Importance of and Factors to Be Considered in Selecting New Towns for Malaria Control Demonstrations. James A. Hayne, Columbia, S. C. 368

Discussed by L. D. Fricks, Memphis, Tenn.; W. G. Stromquist, Memphis, Tenn.; J. A. LePrince, Memphis, Tenn.; C. H. Kibby, Birmingham, Ala.

Fish as an Anti-Mosquito Agency. J. A. LePrince, Memphis, Tenn. 371

Efficient and Economical Use of Oil in the Prevention of Malaria. E. B. Johnson, Montgomery, Ala. 374

(Concluded on Next Page)

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TABLE OF CONTENTS—Concluded

Papers of Mr. J. A. LePrince and Mr. E. B. Johnson discussed by Samuel F. Hildebrand, Washington, D. C.; T. H. D. Griffitts, Norfolk, Va.; W. H. W. Komp, Camilla, Ga.; H. R. Carter, Washington, D. C.; George Parker, Jacksonville, Tex.

MEDICINE—Internal Diseases, Pediatrics, Neurology, Diagnostic Methods, Etc.

The Tolerance of Children for Digitalis. Hugh McCulloch and Wayne A. Rupe, St. Louis, Mo. 381

Discussed by W. McKim Marriott, St. Louis, Mo.; H. Leslie Moore, Dallas, Tex.; G. Canby Robinson, Baltimore, Md.; J. T. Halsey, New Orleans, La.

Encephalo-Meningocele Through the Foramen Cecum. W. L. Funkhouser, Atlanta, Ga. 385

Rural Administration of Anti-Syphilitic Treatments. Hardie R. Hays, Jackson, Miss. 387

A Unique Case of Chronic Morphinism. Samuel T. Lipsitz, St. Louis, Mo. 389

SURGERY—Railway, Industrial, Gynecological, Obstetrical and Urological

A Review of 300 Cases of Breast Disease. Irvin Abell and Stuart Graves, Louisville, Ky. 390

Discussed by W. W. Crawford, Hattiesburg, Miss.

The Value of Blood Chemistry to the Surgeon. Wm. H. Bailey, Oklahoma City, Okla. 394

Discussed by S. F. Hoge, Little Rock, Ark.

Congenital Hydronephrosis. A. I. Folsom, Dallas, Tex. 399

Discussed by George R. Livermore, Memphis, Tenn.; Abraham Nelken, New Orleans, La.; W. A. Frontz, Baltimore, Md.

The Correlation of X-Ray Interpretations, with Clinical Findings and End Results in Railway Surgery. E. T. Newell, Chattanooga, Tenn. 402

Discussed by Chas. H. McCollum, Fort Worth, Tex.; Walter E. Vest, Huntington, W. Va.; T. H. Hancock, Atlanta, Ga.; J. A. Ort, Paris, Ky.; E. D. Martin, New Orleans, La.; W. W. Harper, Selma, Ala.

EYE, EAR, NOSE AND THROAT

Malaria and Eye, Nose and Throat Infections. Harvey B. Searcy, Tuscaloosa, Ala. 406

A New Treatment for Hay-Fever During the Attack. Clifton M. Miller, Richmond, Va. 408

SOUTHERN HOSPITAL ASSOCIATION—Symposium on Group Medicine and the Closed Staff

Some Observations on Group Medicine. W. P. Harbin, Rome, Ga. 410

Association vs. Isolation for a Young Man in Private Practice. Stewart R. Roberts, Atlanta, Ga. 411

The Organized or Closed Staff: Its Advantages and Possibilities. J. B. Franklin, Dallas, Tex. 415

The Advantages and Disadvantages of Group Practice. The Relation of a Group to a Public Hospital. Is It Essential for a Group to Control Its Hospital? 421

Discussed by Stuart McGuire, Richmond, Va.; A. L. Blesh, Oklahoma City, Okla.; J. A. Stucky, Lexington, Ky.; Arthur W. Ralls, Gadsden, Ala.; E. A. Stevens, Mayfield, Ky.; E. B. Bradley, Lexington, Ky.; George Dock, St. Louis, Mo.; H. H. Trout, Roanoke, Va.

EDITORIALS 423

CORRESPONDENCE 428

BOOK REVIEWS 428

SOUTHERN MEDICAL NEWS 429

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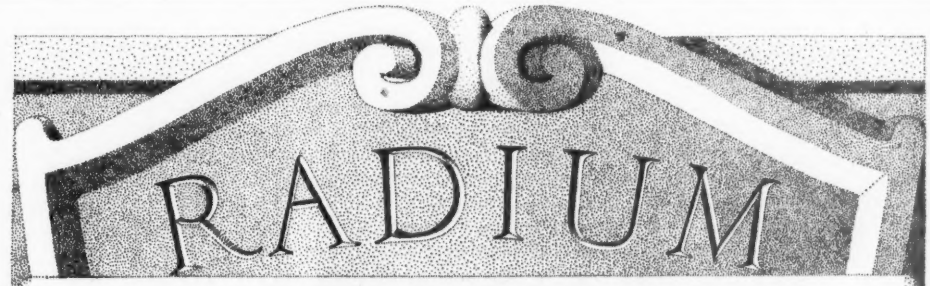

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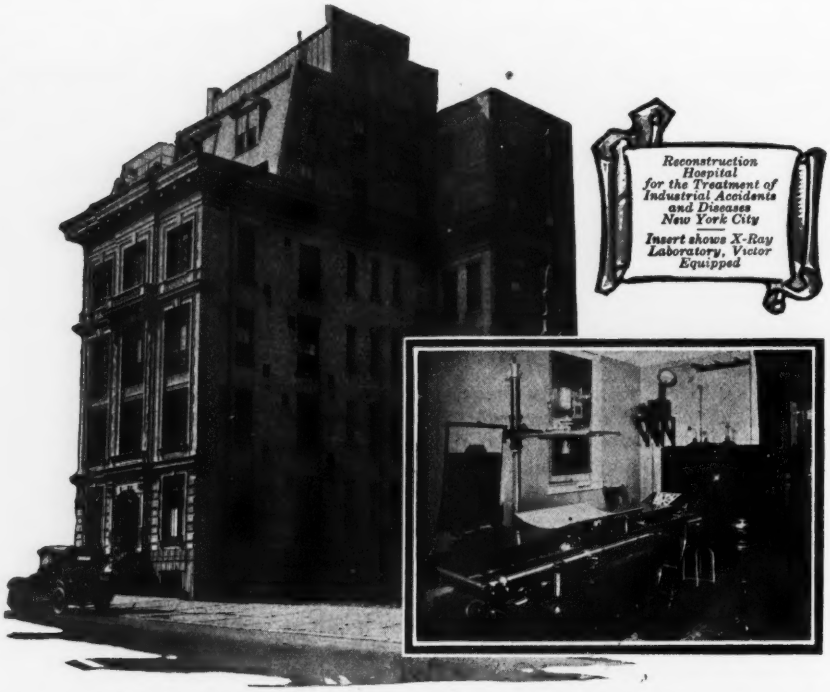

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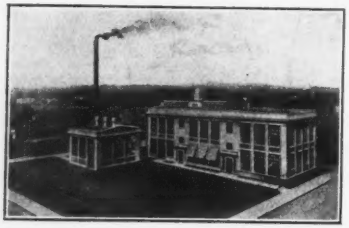

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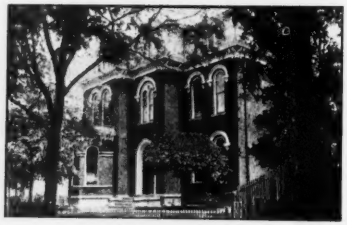

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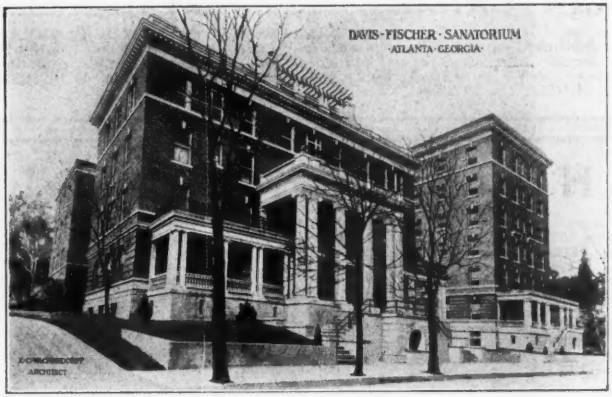

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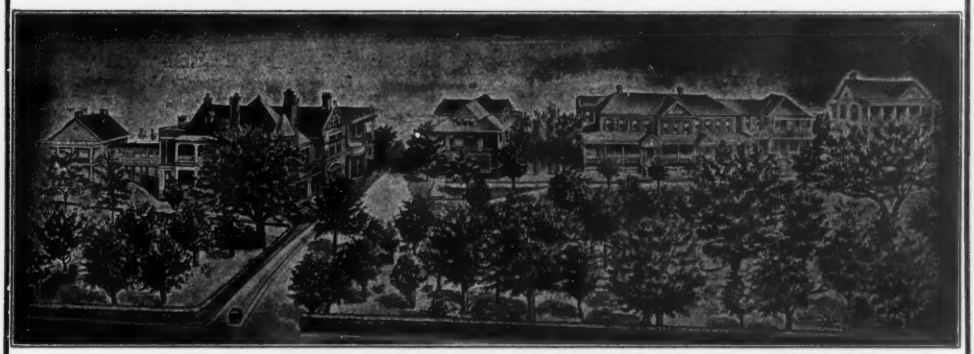

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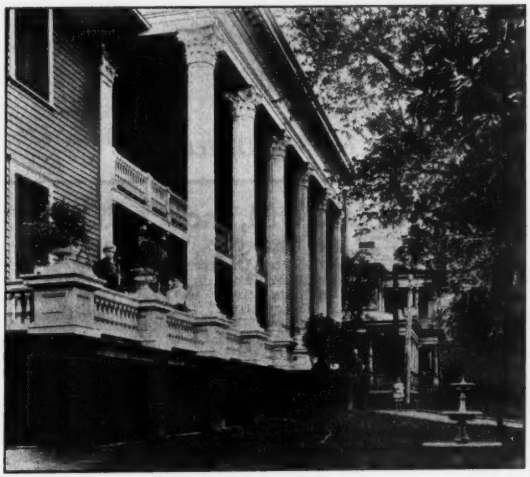

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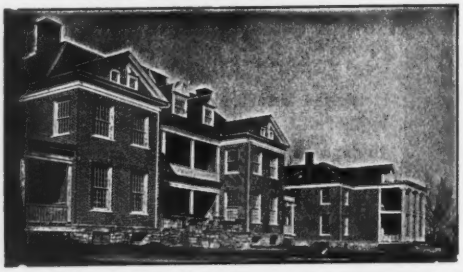

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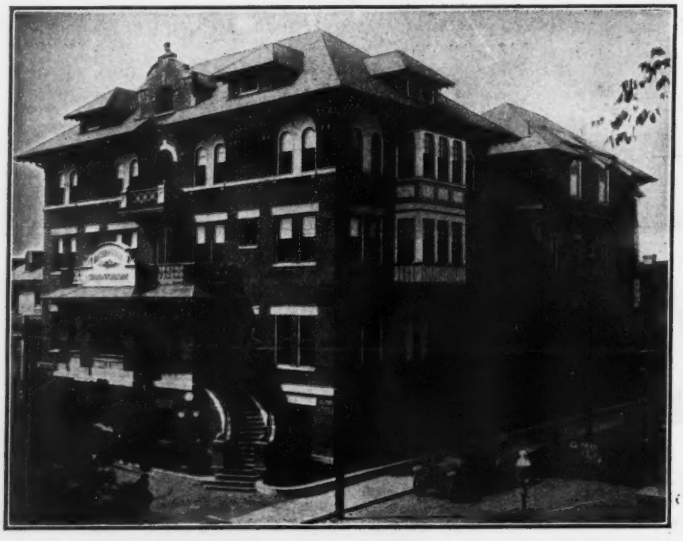

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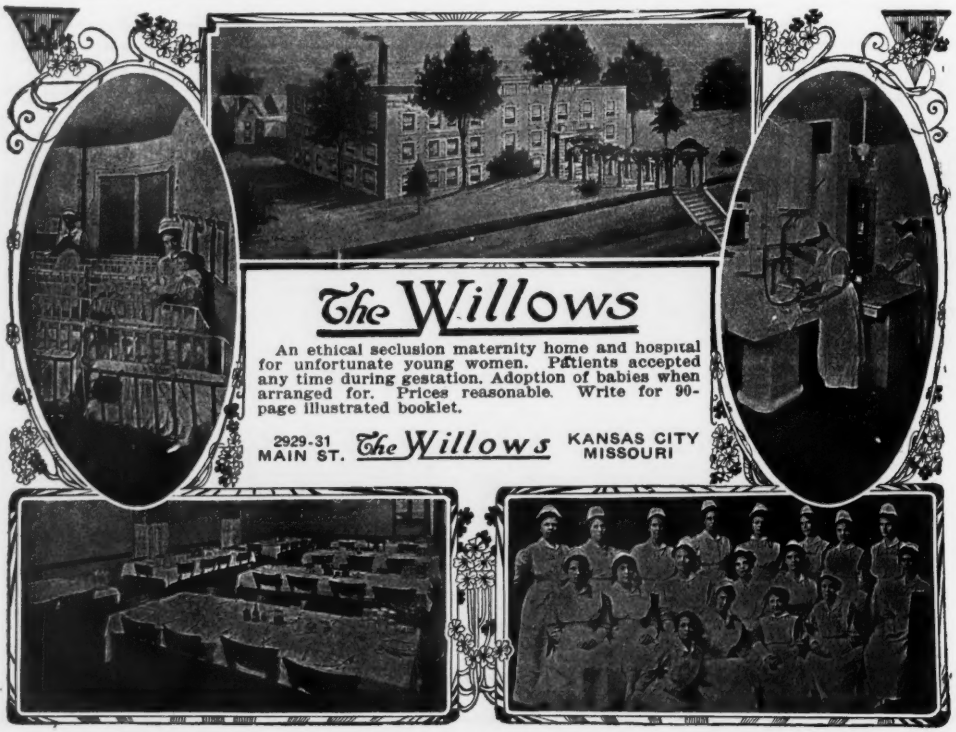
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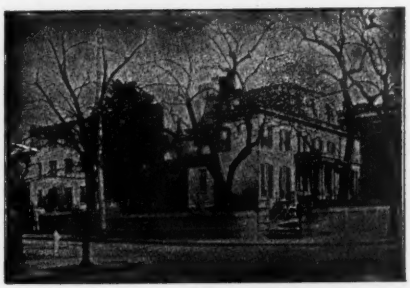

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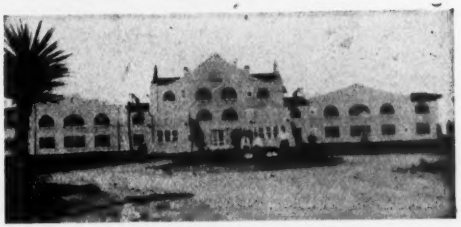

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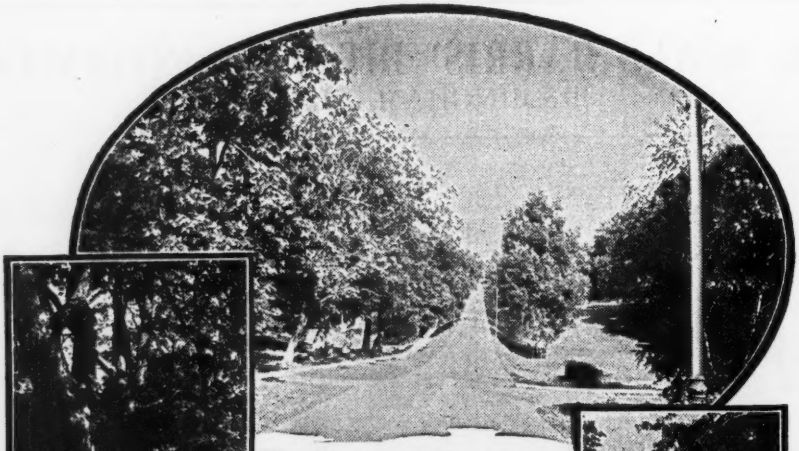

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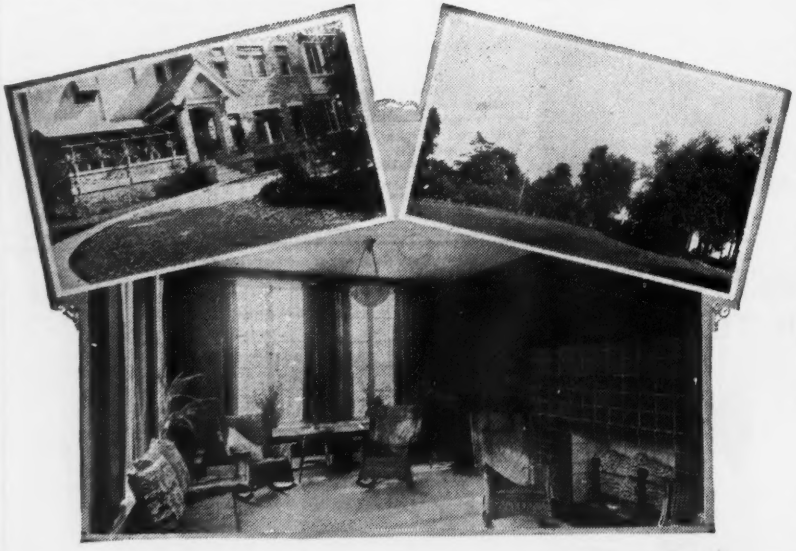

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Volume XV MAY 1922 Number 5

TROPICAL DISEASES AND PUBLIC HEALTH

SYMPOSIUM ON MALARIA

DIFFICULTIES AND ERRORS BEFORE AND AFTER ANTI-MALARIA CAMPAIGNS*†

BY C. C. BASS, M.D.,
New Orleans, La.

The difficulties and errors before and after anti-malaria campaigns are so numerous that only a few of the more important ones can be pointed out and briefly discussed in the time at our disposal.

These difficulties and errors vary considerably in their relative importance and in their solution or the manner in which they may be avoided, with (1) the extent of the campaign, (2) the character of country and kind of people to be dealt with, and (3) the anti-malaria activities that are to be carried out. The campaign may involve only a small area like a small town or village; a small rural community; a much larger area, including, perhaps, towns or villages and rural communities; a whole county or possibly a group of counties. If a town, it may be well located with regard to mosquito control measures and the people may be progressive and receptive, or the reverse of either may be true. If a larger rural area, the country may be well developed and have good natural drainage, or these conditions may be reversed. The population may consist largely of the more intelligent, progressive class or they may be largely of the ignorant, shiftless, suspicious class who are doubtful of the motive of anybody who offers them advice or assistance, especially if gratuitous. As a result of the circumstances and conditions that may exist in one campaign or another, it may be necessary for the activities to consist largely or almost entirely of only one of the different measures that may be employed against malaria. In other cases it may be practical to take advantage of all available measures. In this discussion we shall have in mind an anti-malaria campaign involving a large area, like, for instance, a whole county, in which the conditions with regard to development, kind of people and density of population are no more favorable than those existing in the average agricultural county in the South.

DIFFICULTIES BEFORE THE CAMPAIGN

One of the chief difficulties before the campaign is to get the people sufficiently interested to sincerely want it. Malaria is such an insidious disease that it is generally considered lightly, as a necessary evil of little importance, by those who live in localities where it prevails. In many persons the attacks cause the mildest illness and, in fact, many have the infection without having any symptoms that are recognized to be due to malaria.

Practically no one in the community fully realizes the importance of the disease from an economical nor from a health standpoint. The physicians are in better position to appreciate how much sickness malaria causes, but not many of them put forth much effort to inform others about the disease. They do not look upon it as their duty. On the other hand, there is

*Read in Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

†From the School of Medicine, Tulane University, New Orleans, La.

a tendency to secrecy as to the nature of diseases, especially with regard to remedies for them. The occupation of most physicians is curing and not preventing disease.

Before an anti-malaria campaign can be undertaken the interest of a good part of the leaders in the community must be aroused. There are always a comparatively small number of persons in each community whose support is necessary before any activity requiring much financial outlay by the community can be inaugurated. It is necessary, therefore, to get their interest, but it is not necessary to make much effort to interest the general population until the campaign begins.

Another difficulty before the campaign is to secure the necessary appropriations to support it. In most of the campaigns in the past, a part of the cost has been paid by the state board of health or other health agency and only a part by the community. In the future, more of the burden must be borne by the community benefited. Funds judiciously spent in malaria control quickly return enormous dividends in money and health. Therefore, there is no reason why the community should not pay the cost.

The difficulty of obtaining the necessary appropriations is to be overcome by properly presenting to those who are to decide the matter well prepared facts and figures as to the prevalence of malaria in the community and what it costs in sickness, in loss of time and in money. Prevalence of malaria in a community costs more than it should cost to control it and the man who can present the facts impressively to those who have authority to make such appropriations should have little difficulty in getting what is needed.

Another difficulty before the campaign is securing a suitable staff of competent persons to direct and carry out the work. For a campaign on a large scale, a capable director and many assistants are needed. Much of the work of the different members of the staff is highly specialized work and requires considerable training of the right sort in the particular line.

In the mosquito control activities there will be needed directors for drainage, oiling and screening operations, and perhaps for fish control. In the malaria carrier control activities, there will be needed physicians who know malaria and also microscopists. Both of these must be well trained in the particular work they are to do. Physicians do not get in the medical schools the kind of training that is needed to fit them for anti-malaria campaign work. They are taught and study chiefly from the standpoint of diagnosis and treatment of malaria and not from the standpoint of control and prevention. Unfortunately, they do not learn much about malaria or other diseases from a public health standpoint. It is remarkable and discouraging how little correct, practical advice as to the cause and prevention of malaria many physicians are able to give.

On account of the lack of any considerable number of persons adequately trained to carry on the special activities that are required, no large amount of anti-malaria campaign work can be successfully carried on at the present time. Such training must be provided in some way before much progress can be made in malaria control on a large scale. We can get the people interested, we can secure the necessary funds, but we cannot get the necessary properly trained staff.

ERRORS BEFORE THE CAMPAIGN

One of the most important errors likely to be made before the campaign is failure to secure the full cooperation of the physicians. Their help may not be so badly needed in campaigns involving only small areas, but it is essential for greatest success where large areas are involved.

Such a campaign will include both anti-mosquito measures and, perhaps, to a larger extent, cure of infected persons. The physicians treat and advise from time to time a large part of the infected, especially those who have attacks. As a rule, the methods of treatment employed vary greatly, but in most instances little concern is given to cure of the infection after the clinical symptoms have been relieved. The treatment given is inadequate. As a result, the infection is not cured; the person remains a carrier, likely to relapse later, and a potential source of infection

to others. Much of the transmission of malaria that occurs is from persons who have been treated for attacks by physicians. To whatever extent they cure the infection in the cases they treat, to the same extent the number of carriers will be reduced. It is necessary that they should employ and advocate effective treatment for this purpose.

The organization conducting the campaign will be advising the standard treatment for the cure of the infection. It is confusing to the people and tends to lessen their confidence in the advice given if the physicians give contrary advice. On the other hand, if the physicians advise and practice the same method as the health agency, the people place more confidence in all the work. It is quite confusing for a person who has been advised to take the standard treatment by the health agency to have a physician in whom he has always had the most implicit confidence come along and advise him to take another treatment which the physician tells him is much better. I should personally hesitate to undertake an anti-malaria campaign anywhere unless I could get at least a majority of the physicians to agree to endorse and employ the standard treatment. It is important to get the definite promise of cooperation of the physicians in this regard before the campaign begins and it would be an error to neglect this.

Another error that has sometimes been made before the campaign, is to fail to plan to employ all useful and practical measures. It is all right in experimental work to employ only one measure or another to the exclusion of all others, but it is a mistake to neglect any of them otherwise. Mosquito control measures may be the most important in towns and densely populated areas, but cure of carriers should not be neglected. In less densely settled rural areas, treatment of infected persons may be the most important measure, but this does not mean that practical mosquito control measures, such, for instance, as screening, should be neglected. In my judgment, it would be a most serious error to neglect to attach to quinin control a full measure of importance in planning any extensive anti-malaria campaign.

DIFFICULTIES AFTER THE CAMPAIGN

One of the difficulties after the campaign is the tendency for the former conditions to return as a result of neglect. Certain mosquito control work may be more or less permanent, but much of it may be temporary. Neglect soon leads to loss of much of what has been gained. Drainage ditches become clogged or are filled up; screens, especially in the homes of the poorer class, are neglected and become inefficient; conditions develop which render fish control less effective; and the educational work is gradually forgotten.

Another difficulty is the changing population. Those who move into the community after the campaign have not had its benefit. Many of them are infected with malaria when they come and are sources of infection to others who may have been freed from the disease during the campaign.

What a large factor changes in population may be is illustrated by a recent observation in Sunflower County, Mississippi. A resurvey of an area of 100 square miles made during 1920 showed that only 62.84 per cent of the people living in the area lived in it during 1918. The total population had not increased. Therefore, almost 40 per cent of those who lived in the area in 1918 when an anti-malaria campaign was conducted had moved away and an equal number of others had moved in. This much change in population occurred in approximately two years' time. Those who moved in had much more malaria and were possible sources of reinfection to those who had previously been relieved of their infection.

In other localities there may not be so much changing in population, but it will be a difficulty of considerable importance almost anywhere. The larger the area covered by the campaign the less harm it will do, because, if large enough, many of those who move into a community will be from another community that is also reached by the campaign.

ERRORS AFTER THE CAMPAIGN

Perhaps the most important error after the campaign is to discontinue or too greatly reduce activities. It is a mistake to think that after the campaign, however successful it may have been, the situation can be left to take care of itself afterward. Malaria cannot be left alone. Although less effort be required after the first intensive campaign, the fight against it must be continued indefinitely, especially in areas surrounded by much malaria. Perhaps the most ideal plan is for the anti-malaria campaign to be continued as a part of the activities of the county health organization.

SUMMARY

The difficulties and errors discussed may be summarized as follows:

Difficulties before the campaign are

(1) To get the people sufficiently interested to want the campaign;

(2) To secure the necessary appropriation of funds to support it; and

(3) To secure a suitable staff of competent, well trained persons to carry out the campaign.

Errors before the campaign are

(4) Failure to secure the definite promise of full cooperation on the part of the physicians who practice in the area; and

(5) Failure to plan to employ to best advantage and in accordance with their relative importance under the existing circumstances, all available measures, including especially quinin control.

Difficulties after the campaign are

(6) Return of former conditions after the campaign as a result of neglect and loss of interest; and

(7) Changing population resulting in introduction of many infected people.

Error after the campaign is

(8) Discontinuing the campaign too soon or too greatly reducing the activities.

DISCUSSION

Dr. L. D. Fricks, U. S. Public Health Service, Memphis, Tenn.—Not having heard all of Dr. Bass' paper, I hardly feel competent properly to discuss it, but I do feel very strongly like saying something about the difficulty of attending two anti-malaria conferences at the same time when they are held in different places. All my time has been occupied in attendance at our malaria conference which is being held in another building, but as a part of your Public Health Section; and it was only by accident that my attention was called to Dr. Bass' paper in time for me to hear even a part of it read. I think we are all to be congratulated upon the movement now on foot for the better arrangement of the different section meetings whereby we may be able to see and hear what the other fellow is doing.

I really do not understand why there should be such a thing as an anti-malaria campaign conducted anywhere in the Southern states, nor do I sympathize with the idea of a campaign as applied to malaria control, if "campaign" carries with it, as to me it does, the idea of a temporary drive resulting in a finished job. I can see very clearly where there is abundant reason for the investigation of malaria and malaria control problems, and the Public Health Service and other agencies and individuals have been conducting such investigations in the laboratory and in the field for several years past. I can also understand and heartily approve of the evolution of a definite and permanent program for malaria control by the responsible health authorities wherever malaria is of serious sanitary importance. Such a program should be undertaken by every state health officer in the South. I have the pleasure of being in charge of the cooperative program for malaria control which was entered into by the Public Health Service, ten state health departments and the International Health Board. This cooperative program is now successfully in operation in ten of our Southern states and is gradually but surely being adapted to the needs of the different states concerned and properly coordinated with their other health activities.

Working under our cooperative program for malaria control we have conducted control demonstrations in nearly one hundred urban communities scattered throughout the South. Malaria surveys, which, by the way, have considerable educational value, have been made in many more communities during the past two years. We have experienced no difficulty in controlling malaria in the small towns in which we have worked through drainage, oiling and fish.

Dr. Bass, as we all know, conducted in the Delta region of Mississippi a very exhaustive and scientific investigation of the more effective treatment of malaria by quinin. According to the statistics which I have seen bearing upon Dr. Bass' work in quinin sterilization, his results were not so good as those obtained by us in southwest Georgia, where we followed Dr. Bass' methods as nearly as possible. The only point I have in mind in making this statement is that different methods for malaria control must be employed and different results will be secured in different localities; and that a temporary campaign for malaria control will never secure permanent results.

Unless we can develop a practical program for malaria control which will fit in with the other health activities of the state and county health authorities we are wasting time, effort and the people's money.

Mr. J. A. LePrince, Senior Sanitary Engineer, U. S. Public Health Service, Memphis, Tenn.—One of the big errors we make in our malaria campaign is insufficient instruction to the foremen in the field. We are not getting so good results as we might get if there were a closer relation between the man up at the top of the whole organization and the man that has to bear the heavy burden out in the field. A closer touch, a closer sympathy, will in many instances mean better results being accomplished.

Dr. Bass (closing).—Perhaps the most important question raised in the discussion is relative to the fact that there is more malaria reported from Bolivar and Sunflower Counties now than there was four or five years ago.

We conducted various experiments in different communities in about one-third of the total area of Bolivar County during 1916 and 1917. These experiments were for the purpose of getting information. Of course, it was expected that at the same time many people would be cured of their malaria and the prevalence of the disease would be reduced. However, on account of the experimental nature of the activities, it would not be reasonable to expect any considerable or lasting effect on the prevalence of the disease in the whole county. We moved away from Bolivar County at the close of 1917 and nothing whatever has been done there in nearly four years to hold or continue whatever effect the activities had on the prevalence of malaria.

An effort was made during 1918 to control malaria by intensive work and supplying the proper quinin treatment in an area of 100 square miles in Sunflower County. This is one-seventh of the total area of the County.

Since 1918 quinin treatment has not been furnished free, as it ought to be to get best results, but the experiment has been tried to get the people to purchase the necessary quinin. This has not been entirely successful.

I am aware of the fact that efforts to control malaria by curing the carriers has been more successful in other localities, particularly in Mitchell County, Georgia, than it appears to have been in Bolivar and Sunflower Counties in Mississippi, and I am glad to see it. It is probable that the intelligence of the people in the different localities may have been a factor in determining the results.

MALARIAL RELAPSES

By H. H. Howard, M.D.,
International Health Board,
New York, N. Y.

If we are to judge by some of the reports of the successful control of malaria by anti-mosquito measures with which we have been favored in recent years, we must conclude that the question of malarial relapses as a factor in continuing a proportion of the malarial incidence rate from season to season has received but scant attention. It is not unusual to hear of the complete disappearance of malaria in a given area as a result of the first year of mosquito control, and that, too, in areas where the rate of incidence was stated to be high prior to the inauguration of control measures. In these reports and in others where less sanguine interpretations are given to the results of mosquito control, it has rarely been recognized that the rate of malarial incidence for a given season may be the combined result of two factors, i. e., new infections and relapses from infections of previous years.

By a malarial relapse is meant an attack of malaria with definite clinical symptoms which develop after a period of weeks, months or even years following an initial infection, and which are not due to recent reinfections. It is essential that such an attack follow a complete cessation of all active symptoms for a period of time sufficiently long to justify the assumption that the malarial parasites, though remaining in the body, have been in a state of inactivity not productive of clinical symptoms. Manifestly the term does not include those recurrences marked by chills, fever or other acute symptoms, which are often met with at intervals of 24 to 72 hours in the course of an acute attack of malaria, and which are due to the normal process of sporulation of the malarial parasite in the blood.

The interest of the writer was stimulated in the problem of malarial relapses by observations made while directing an experimental campaign for the control of malaria by anti-mosquito measures in a district in central Mississippi during the years 1918 to 1920, inclusive.*

The district in question was located in the hill country purely rural in character, containing neither towns nor villages. In climate, rainfall, soil and drainage, as well as distribution of population and agricultural products and methods, it seemed to represent average conditions throughout the hill sections of the malarial belt of the Southern states. Conditions for

*The experimental campaign referred to was undertaken by the International Health Board of the Rockefeller Foundation in cooperation with the Mississippi State Board of Health.

mosquito production were neither more nor less favorable than the average. The district embraced about 36 square miles of territory, containing 172 homes, housing 830 persons, most of whom were engaged in agricultural pursuits.

The entire season of 1918 was devoted to the study of natural conditions, no attempt being made to control mosquito production, nor to influence in any way the prevalence of malaria. One of the first steps taken was to map the district and to secure a complete census of its population, recording on individual cards the name, age, sex, race, and length of residence in the district. These cards also provided for a complete record of each individual regarding illness due to malarial infection and the results of blood examinations.

In 1919, the district was divided into two areas. In the first, containing approximately 22 square miles, which will be designated as the "controlled area," experimental measures for the control of mosquito production were instituted and maintained for two years, i. e., 1919 and 1920. In the second area, which will be known as the non-controlled area, consisting of approximately 14 square miles, no anti-mosquito measures were employed, but the study of natural conditions was continued and the observations used as a check or control on the experiments made in the first area.

The controlled area contained 130 homes and 595 people in 1919, and the non-controlled area 51 homes and 214 people. Some shifting of the population occurred and in 1920 there were 139 homes and 616 people in the controlled area, and 47 homes housing 199 people in the non-controlled area.

Our inspectors, in addition to their duties in connection with the measures for mosquito control, were required to call at the homes of the people once every ten days and ascertain if illness of any nature had occurred among the people, and if so, to secure all possible information concerning the illness, its nature, symptoms, duration, termination and the nature of treatment given. The information secured was brought to the field office by the inspectors in the form of sick reports. All cases of illness reported, except those manifestly not of a malarious nature, were then investigated by personal visits by the writer or his assistant and diagnoses made. By this method, and the precautions taken against errors in diagnosis, we feel that our statistics regarding the incidence of clinical malaria are reasonably correct and trustworthy.

In addition to the collection of clinical histories, blood smears were secured, in the summer of 1918, from a representative number and class of people, and examined for malarial parasites. It was found that only 26.6 per cent of those found harboring the malarial parasite in their blood manifested clinical symptoms.

At the opening of the season of 1919, anti-mosquito measures were put into effect and maintained throughout the season in the controlled area and observations were continued in the non-controlled area. The same method as that used in 1918 was employed for the collection of clinical histories of malaria. In 1920 the measures for mosquito control were maintained in the controlled area, and observations in the non-controlled area were continued, and the same method of collecting clinical histories was followed in both areas. The incidence of malaria in the two areas during the years 1919 and 1920 is shown in the following table:

RATES OF CLINICAL MALARIA FOR THE YEARS 1918 TO 1920, INCLUSIVE

Year	Location	New Infections Per Cent	Apparent Relapses Per Cent	Totals
1918	*Controlled area			18.1
1918	*Non-controlled area			17.29
1919	Controlled area	3.3	2.24	5.54
1919	Non-controlled area	6.5	3.7	10.2
1920	Controlled area	1.94	3.08	5.02
1920	Non-controlled area	10.55	11.05	21.6

By new infections we mean those cases of malaria whose clinical histories show no malarial attacks during the previous year. Apparent relapses refer to those people who had definite attacks of mala-

*No control measures were employed in 1918.

ria during the previous season, or seasons. In fact, most of the cases so classified gave histories of seasonal attacks, occurring usually in either the spring or autumn, or both seasons, for a period of several years, and who did not have proper quinin medication for sterilization.

Referring to the above table, we note that the rate of incidence for clinical malaria in the controlled area for 1919 is 5.54 per cent, which is the sum of the rates for new infections, 3.3 per cent, and apparent relapses, 2.24 per cent.

In 1920, in the same area, the rate of incidence for clinical malaria is 5.02 per cent, which represents the sum of the rates for new infections, 1.94 per cent, and apparent relapses, 3.08 per cent.

From these figures we are able to deduce the fact that in 1919 apparent relapses constitute 44.1 per cent of the total number of cases of clinical malaria occurring in the controlled area for that year, and in 1920 apparent relapses supply 61.3 per cent of all the malaria occurring in the controlled area for that year. It follows, then, that new infections constitute 55.9 per cent of the cases of clinical malaria in the controlled area for 1919, and 38.7 per cent of the cases which occurred in 1920.

It would seem normal, under conditions of mosquito control, that the change in ratio between new infections and malarial relapses should be toward a decrease in the former and an increase in the latter from year to year until complete mosquito control is secured, when new infection should cease. Unless spontaneous cures often occur, because of the limitations of the life of the malarial parasite in the human host, it would also be expected that malarial relapses would increase for a time, since by the terms of our classifications the new infections of one season become apparent relapses of the following season if they develop an attack of malaria.

It will be noted that the rate for apparent relapses in the non-controlled area for 1920 is 11.05 per cent. This number practically represents the sum of the rates for new infections, 6.5 per cent, and apparent relapses, 3.7 per cent, of the previous year, plus a fractional per cent which arose from a small number of people who moved into the area, giving histories of malarial attacks the previous year, and who developed malaria in 1920 What seems to have happened in this area is that practically every individual classed as a new infection in 1919 developed an apparent relapse in 1920, and every case classed as an apparent relapse in 1919 suffered one or more attacks of malaria in 1920, and hence was continued under the same classification.

It is realized that the people living in the controlled area were not entirely free from the dangers of reinfection during either of the seasons of 1919 and 1920, and those who know of the difficulties of mosquito control in a comparatively large rural area well understand why this was so. Certainly the people living in the non-controlled area were exposed to malarial infection. For these reasons a certain proportion of the cases classed as apparent relapses in our tabulations may have been reinfections, but the writer cannot believe that all or even the greater part of them were reinfections. It is a significant fact that the incidence of malaria among the group classed as apparent relapses was very much higher each season than among any other group or all of the remainder of the population of the areas.

A review of the literature on malarial relapses, mainly of British, Italian, Dutch and American sources, shows that it has long been recognized that malarial relapses may occur after long intervals.* A number of authentic cases of long-term relapses can be cited, which are thought to prove that the period of latency in malarial infections is often long enough to justify the conclusion that a proportion of the attacks of malaria developing in a given season are malarial relapses from infections of the previous season.

Arguments and proofs of the existence of long-term relapses apply with equal or greater force to short-term relapses. In the consideration of short-term relapses we must distinguish between them

*A fairly exhaustive digest of the literature on malarial relapses prepared by the Information Service of the Rockefeller Foundation will be furnished to persons interested in the subject.

and the periodical attacks, with intervals of only a few days, which characterize the normal course of the intermittent types of malaria. This can be done by keeping in mind the statement already made that in malarial relapses the interval between the last acute attack and the relapse must be of sufficient length of time to justify the conclusion that the parasite, though remaining in the body, has assumed a state of inactivity as regards the production of active symptoms.

In September, 1911, the Department of Sanitation of the Isthmian Canal Commission sent a questionnaire to various authorities on malaria throughout the world, asking for information on the frequency, cause and nature of malarial relapses. The following table summarizing the replies received to the questionnaire shows that eminent authorities agree that the number of relapses in malarious sections constitutes a very large part of the rate of incidence.

Author	Year	Cases	Relapses	Pr Ct.
Polettini	1915	6,891	4,754	68.9
Stott	1915	524	162	31
Zorini	1905-15	549	449	81.9
Mommi & Fusco	1911	681	417	61.2
Caccini	1904	6,579	2,695	40.9
Martirano	1900	737	534	72.4
		15,961	9,011	56.5

While we are not immediately concerned in this paper with the etiology of malarial relapses, about which there is much disagreement, yet it may be of interest, and also of aid in the interpretation of what has gone before, to refer to the two theories on this subject. The old theory of malarial relapses was, in effect, that beneath a certain level of asexual reproduction of the malarial parasite, the disease is latent. Sims estimated that the greatest number of parasites that the human host could endure without physical reaction, i. e., active symptoms, was about two billions.

The diminution in the number of parasites to the above-mentioned level where active symptoms disappear may be due either to the action of quinin or the protective forces of the body, or both. The process of asexual reproduction is continued through the interval without modification or interruption, and no abnormal change occurs in the form of the parasite. However, the number of parasites is small, so that no symptoms are produced, until, for some reason, such as exposure to extremes of temperature, exhaustion, unfavorable climatic changes, or illness from some other disease, the bodily powers of resistance are lowered, when the parasites multiply rapidly and a relapse occurs. This theory and modifications of it probably have the support of a majority of the authorities of today.

The second theory of the etiology of relapse in malaria is that of Schaudinn, who claims that some sexual form of the malarial parasite is developed from the asexual cycle, which is more resistant to quinin and the action of the protective forces of the body, and that relapses are due to the parthenogenesis of the female, or macrogamete.

It seems to be proved beyond question in the authoritative writings on this subject that malarial relapses occur with great frequency for long periods after the initial infection is acquired, and that the facts in the case fully justify the conclusion that the malarial morbidity rate of any given year is due in a large measure to relapses from infections received the previous year, or years.

Most of the investigators in the malarial field have been medical men and bacteriologists, and rarely have they been interested primarily or particularly in the public health phase of the disease, i. e., its control and eradication. The important role played by the anopheles mosquito in the transmission of malaria has led to an exhaustive study of its life history and habits by the entomologist. Thus the public health worker who would formulate comprehensive and effective measures for the control of malaria must secure from the laboratory a working knowledge of the life cycle of the parasite; from the medical clinician he must secure a proper knowledge of the symptoms of the disease, and of the medication for treatment, cure or prevention; and from the entomologist he obtains his knowledge of the life history and habits of the anopheles mosquito.

It is obvious that from each of the three sources mentioned essential infor-

mation is to be had, and the individual who would engage in a serious attempt at the control of malaria, even in a circumscribed area, cannot properly equip himself for the undertaking unless he approaches each of the three sources of information with an open and unbiased mind prepared to receive and rightly interpret and correlate the information obtained and translate it into comprehensive and practical measures of control.

There are those of a medical bent of mind who seem to find in quinin sterilization and prophylaxis an adequate solution of the problem of malarial control and who look upon mosquito control as unnecessary and impracticable except in selected areas. There are others who insist that malarial control is a problem of the sanitary engineer, and look with distinct disfavor upon any suggestion of merit in the use of quinin as a measure of control. Both of these views seem to the writer to be extreme and not likely to lead to the most satisfactory results.

If the case of malarial relapses is proven, and a large per cent of the malaria each year is the result of infections acquired in previous seasons, the use of quinin for sterilizing carriers is clearly indicated, for it is obvious that malarial relapses will continue to occur whether mosquitoes are present or not.

It is for this reason that malarial relapses should be considered an important and limiting factor in malarial control by anti-mosquito measures alone, and it leads the writer to conclude that the use of quinin for sterilization of carriers is not only justified as an auxiliary measure in all attempts to control malaria by anti-mosquito measures, but is essential if early and satisfactory results are to be obtained. This would seem especially true where malarial control is sought in areas of great prevalence where relapses seem to occur with great frequency and persist through a long period of time. With the large volume of malarial control work which is in progress in the United States it would be comparatively easy to secure much valuable data on the subject if those directing such work would turn their attention to it.

61 Broadway.

NECESSITY FOR AND METHODS OF SECURING ACCURATE MALARIA STATISTICS IN DEMONSTRATION AREAS*

BY OSCAR DOWLING, M.D.,
State Health Officer,
New Orleans, La.

That the securing of accurate or at least reasonably accurate malaria statistics in demonstration areas is necessary, needs no argument. Unless we can show the effectiveness of the control work by actual figures, we shall have difficulty in convincing those who hold the purse-strings that the cost is justified. We need not only statistics for the period during which control work is done, but we need as well figures for at least one year and preferably several years previous to the demonstration period.

Unfortunately, we do not always have these figures. It has been difficult to get physicians to report malaria and information received by canvasses is often misleading. It has even happened that the aroused interest in malaria, incident to a control campaign, has brought in more reports than were received in the year previous to the campaign.

Malaria is not in the same class as smallpox, measles, and diphtheria, for example, and theoretically, we should be able to get more complete morbidity reports if regulations requiring reports divided diseases into two classes, the cases of one to be reported immediately and the others to be reported monthly, for the reason that the clerical work for the physician would be less. However, it has worked out differently in Louisiana. We tried both methods this year. Two hundred eighty-one physicians reported nineteen hundred and nineteen cases of malaria from three hundred and four towns in sixty-three parishes on the standard franked post cards. On the monthly report forms, we received reports from only forty-four physicians reporting six hun-

*Read before the National Malaria Committee (Conference on Malaria), acting as Malaria Division of the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

dred and ninety cases from seventy-seven towns in thirty-five parishes. This indicates an apparent preference for the individual case card for the making of reports, but at the same time obviously gives incomplete reports even with these.

In Lake Charles this year we tried to get a complete canvass of 1920 cases and their cost by sending questionnaires with franked reply envelopes to every house in town. We secured reports of many cases that had not been reported by physicians and also valuable data relative to the cost of malaria. Such methods, however, like house-to-house canvasses, are expensive, difficult to keep up year after year and results are not comparable with other communities where efforts to obtain reports are less intensive.

The only remedy I can suggest is to educate the practicing physicians to their civic duty in the matter of reporting communicable diseases and to simplify the clerical work connected with such reporting as much as possible.

Some time ago we sent out a map in the State of Louisiana showing the number of deaths that had occurred in the various parishes from malaria. This map was modeled after the map gotten out by Dr. Leathers, of Mississippi, showing the deaths resulting from tuberculosis in the State of Mississippi. One of the parish officials took it up with the Governor, saying that we had done his parish an injustice in printing the number, as they had reported 100 per cent of the cases in their parish, and our records showed only 68 per cent reported in other parishes. This point is well taken.

In Shreveport three years ago, in the investigation that the Police Department instituted, results showed no malaria. With the assistance of one of Dr. Fricks' assistants, we made an investigation as to the presence of anopheles. When we got out our report the newspapers in glaring headlines attacked the Health Department as having done them a great injustice. One of our doctors and our Sanitary Engineer were sent to Shreveport to make this demonstration and we thought the moment we showed the presence of anopheles mosquitoes they would be convinced that malaria was present. Dr. Fricks and the Board have been requested to help them this year. We made a survey and cost estimate for malaria control, but it was rather late in the season and they did not raise the money. I am hopeful that we shall have their assistance, as well as a number of other cities in the State next year. It is very difficult to obtain the assistance not only of the people, but of the doctors who think there is no malaria. I met one doctor on the street who seemed a bit troubled, and I asked him what was the matter. He said he had a patient who had died from malaria. I asked several other physicians, who said they had about four cases of malaria. Yet it was said that there was no malaria there.

I mention these things to show you the difficulty of getting these reports.

DISCUSSION

Dr. M. F. Maxcy, U. S. Public Health Service, Memphis, Tenn.—In examining the reports of the results accomplished by anti-malaria work in demonstration areas, I have the impression that the weakest part of the work has been the gathering and interpretation of statistics to show the effectiveness of the control. Many instances might be mentioned in which, although there is no doubt in the world that the control work has been thoroughly and efficiently done, no one who is familiar with the errors involved in statistical proof would be satisfied with the figures which are presented to indicate the resulting decrease in malaria morbidity. It is perfectly evident to every one that the primary object of an anti-malaria demonstration is to show beyond a reasonable doubt that malaria morbidity can be reduced. Unless this point is firmly established, the whole work will go for nought.

We must start with the fundamental conception that statistics are of value just insofar as they represent the underlying facts accurately; that statistics can never be any better than they were at the source, no matter how vividly and attractively they are presented in the form of graphs. The first requisite, then, in statistical proof is that the error at the source be as small as it can be made practically.

Four methods have been used in gathering information as to malaria prevalence in demonstration areas:

(1) Information supplied by physicians practicing in the locality (impressions, calls, cases).
(2) Information gathered by a house-to-house canvass.
(3) Determination of the spleen rate in a sample of the population.
(4) Determination of the parasite index in a sample of the population.

In regard to the first of these, Dr. Dowling has pointed out some of the practical obstacles

in the way of securing complete morbidity returns. These same practical obstacles have presented themselves to the field worker in a demonstration area, i. e., the difficulty of getting all of the physicians to give a detailed and accurate report of the number of cases of malaria whom they treat over a sufficiently long period to make the data of value. But aside from the practical difficulties, there are certain large errors in the method which should be borne in mind. The first is the primary error in diagnosis. As every one knows in countries where malaria is endemic the clinical diagnosis "malaria" or "malarious" is frequently used to include a polyglot of minor ailments beside the real infections with Plasmodium malariae. Where the figures are large as in the collection of morbidity statistics for a state, this error is more or less constant from year to year and does not materially invalidate comparisons in prevalence. Where, on the other hand, one is dealing with a small area in which there are only five or ten physicians involved and one or two of these are rather liberal in their use of the clinical diagnosis "malaria," a very considerable error may result. The second large error results from the impossibility of measuring the sample of the population which the physicians represent. It is well known that on an average only one-fourth of the persons sick with malaria are seen by physicians, and that this figure varies from one community to another, from one year to another (depending upon economic conditions), and that while a physician may see 50 per cent of the well-to-do persons with chills, they probably see less than 20 per cent of the poor, who resort to "chill tonics." These and other considerations render this method of gathering statistical information through physicians rather unsatisfactory in a demonstration area where a maximum amount of accuracy is desirable.

The second method is the one of "house-to-house" canvass. The chief objection to this is that it is time-consuming and expensive unless the area under control is a very small one. While one can exactly determine the size of the sample of population which has been covered, the probable error of the result is apt to be large. There is a large personal equation entering into the method: that of the individual in each home who gives the information and that of the collector of the information. On each side there may be errors as to interpretation of what constitutes a clinical case of malaria, all the errors of which we accuse the practicing physician, and more, too. While the "history index" gathered in this manner is of some value, the method cannot receive wide applicability because of the reasons outlined.

The third method, that of "spleen index," which has been so widely used in the tropics, has received little attention in this country. It possesses the advantage of being an objective method, subject only to an ordinary degree of skill on the part of the examiner. It has been considered impractical in any large population group on account of habits of dress, feelings of modesty, etc. It has also been stated to be too low a rate to be of value in this country. The obvious advantages of the method as regards the small error at the source would seem to indicate that it might be utilized under special conditions.

Last and most important of all is the parasite index, the examination of blood smears from a considerable number of the population to determine the number harboring malaria parasites. Theoretically it is the most accurate of all methods. Just as the accuracy of the clinical diagnosis of malaria in an individual rests upon the demonstration of the parasite in the blood, to the same extent the epidemiological diagnosis of malaria prevalence in a community is accurate in so far as it is supported by the examination of blood smears from a considerable portion of the population. Practically, however, the method is time-consuming and expensive, and it is not without sources of error. The first error is involved in the skill of the microscopist. This is particularly important where thick smears are used. But even when the skill of the microscopist is above question, it must always be borne in mind that a single smear may fail to reveal the parasite in a person known to be infected, and that the criterion of a "negative" is variable according to the technic and individuality of the examiner.

Without going into further detail, from an examination of the facts presented above, one would seem to be warranted in stating that there is no practical method at present known by which can be determined the exact amount of malaria in a given community at a given time. If this hypothesis is accepted, then, one must logically conclude that this idea should be given up and a method developed by which the relative amount of malaria in a given population group can be measured with a maximum degree of accuracy. This same group can then be used as the basis of comparison with other communities and in the same community from year to year.

The Public Health Service is interested in this problem and it is our intention to work along this line in the next year in an attempt to develop a standard method which can be applied practically in demonstration areas.

Mr. J. A. LePrince, Sanitary Engineer, U. S. Public Health Service, Memphis, Tenn.—There are those here who have succeeded in obtaining 100 per cent reporting of malaria cases from the physicians of the town, and I think the state health officers would all like to know how those are secured. I believe that the physicians of Jacksonville, Texas, do so report, and probably Mr. Parker could tell us how that was brought about.

Mr. George Parker, Sanitary Engineer, Jacksonville, Tex.—I believe the Health Officer of Jacksonville should be given the credit for obtaining these reports. It so happened that he was very much interested in malaria control work and when the cooperating agencies took up malaria control in that town, he showed his interest by taking an active part in the campaign and soon realized that we could not show the benefits the public was deriving unless we had accurate statistics. By periodically visiting the physicians, sometimes as often as several times a week, he was able to record each case of malaria almost as soon as it came to the attention of a doctor. Also, the past records of the doctors

and the drug stores were gone over and accurate information obtained as to the number of malaria cases treated during previous years. That was last year when the campaign was started. This year when the work was continued we decided that more vital statistics were necessary. We needed to know where the malaria was coming from; where the source of infection was and how it should be charged against the town; whether the cases were primary, recurrent or transient. To that end the health officer obtained the cooperation of the physicians, and the results showed that approximately 75 per cent of the cases were obtaining infection outside the control area. We secured data that showed how many cases were transient, how many were recurrent, how many were new infections, and we were able to tell from what section or sections the infection was originating and were able to direct methods for its control.

The Health Officer rendered a monthly report to the City Council, and if to that body of men the malaria rate seemed higher than it should be, the Health Officer was requested to render a detailed report showing the cause.

There is not much more to be said about how the statistics were obtained, except that the Health Officer went out and got them, and so compelled them that they were a most valuable aid in the direction of the control work. It is to the Health Officer and to the physicians who cooperated with him that the credit is due for the excellent malaria reports for Jacksonville, Texas. In other towns I have obtained reports by personally visiting physicians, where the health officer had not the initiative to go after them or to realize their importance.

Dr. D. J. Williams, Gulfport, Miss.—Inasmuch as we have 100 per cent reports in Harrison County, perhaps our method of gathering these reports will be of interest to you.

The earlier we pass a law requiring doctors and practitioners of medicine to report in writing infectious diseases, the better. In our State we have a law providing that a certain class of diseases be reported immediately and all the rest be reported at the end of the month. This only serves to handicap the health officer in his work. What we want is a form report from each doctor in the county every day, for if he does not make a report every day he will not make correct reports.

When I started this work I had a post card printed with all the information I wanted on that card. All the doctor had to do was to fill it in and return it to me. The card has space for reporting a half dozen different diseases: the date, name of disease, name of patient with address, occupation, sex, color, source of infection, etc. That gives you a fair idea of the patient's condition. The only kind of information that is worth anything to a health officer is the information that reaches him immediately, enabling him to control the disease. I have no respect for a report that comes in at the end of the month, which makes the health officer as well as the physician nearly thirty days behind.

We send seven of these cards to each doctor in the County every Friday, dating the first card the date of the following Monday. The cards remind him that he is expected to report daily; that is, if he has any contagious or infectious diseases occurring in his practice on these dates. If not, he may return the blank cards in a batch. They are all self-addressed cards. We have a record sheet in my office with a list of the doctors' names down the left margin of the sheet, with the dates of the month opposite and following the names. Each day when a report is received from him we check off that date. Each day a report is not received we write or call him over the 'phone, notifying him of his failure to report on such dates. When having to call him over long distance I find it a good idea to make him pay the exchange and make him give the reports.

I differ with Dr. Dowling about weekly or monthly reports. It will take an expert accountant to handle and balance a weekly and monthly report. Another thing is to avoid having the doctor make the reports to several departments. For instance, if you have a bureau of venereal disease or tuberculosis and a child welfare bureau, do not attempt to have the doctors report to each of them. He will say, "I won't make any reports. It is too much trouble for me."

As to the accuracy of these reports on malaria, they are correct when you require case reports with names and addresses, etc., and they are not correct when reported by numbers. In this connection I wish to remind you of the fellow who has a tremendous obstetrical practice. I have met men who said, "I have had thirty or forty obstetrical cases during the month." When we have a card case report of them giving the name, age, address, etc., we find his practice dwindles to five or six for the month.

I had a report like this from one of the best physicians in my County, who reported four cases of malaria (father and three sons) in an area which had been worked to keep it free from malaria. On receiving this report, I thought I was "falling down on my job." I asked the doctor if he had taken a slide. "Yes," he said "I took a slide for the father and it was positive."

"Did you take slides for the others?"

He said, "No, I concluded that all four cases were malaria when each one had had chills and fever, and the slide taken for the old man was positive for malaria."

On the doctor's visit two days later he found four cases of smallpox. However, the old man had malaria. He had been to New Orleans. I had three cases of malaria charged up to me and my records had been made up and closed, so they cannot get out.

We now make an index of all the diseases reported to my office. I can show you an index of all the tuberculous, venereal and malarial patients in our County. When I had 1539 cases of malaria in the County in one year, to follow the index for malaria was too much for me, but when we reached 200 I could follow the index and watch the relapses. We try to find where the other members of the family or the neighbors get their infection. You will not get statistics that are worth anything, or upon which you can rely, unless the doctors give the data to you. If a doctor reports too many cases of malaria, fol-

low behind him and see if he makes the right kind of a diagnosis.

Mr. Leslie C. Frank, Sanitary Engineer, Dallas, Tex.—I wish to illustrate the truth of what Dr. Dowling has said regarding the value of accurate malaria reporting.

In Dallas, Tex., a city of 165,000 or 170,000 population, we are not able, unfortunately, to use the method outlined by Mr. Parker of telephoning each physician each day, because we have in the neighborhood of two hundred and fifty physicians. We are using the same method Dr. Williams outlined for Gulfport. We send out seven franked cards each week to each physician, dated and signed for him in advance. The physician, or his secretary, sends in one of these cards each day, filled in, if he has something to report, and left blank if he has had no cases that day. This amounts to a daily roll call and helps materially to prevent what is in most cases unintentional forgetfulness.

Dallas started this system in 1919 and secured a heavy increase in the proportion of cases of malaria reported. The value of the system has been demonstrated by the experience of 1919-20. Nineteen hundred and nineteen was a very dry year and we had very little malaria; 1920 was a very wet year and we had three times as much malaria as in 1919. The natural conclusion of one of the newspapers was that the anti-malaria work was not effective. At this point the value of our improved reporting was demonstrated. Our records showed that while we had three times as many cases reported, there was only a negligible increase in the cases of malaria contracted in Dallas. Practically all of the additional cases had been contracted in the uncontrolled areas outside of Dallas (cotton picking, picnicking, etc.). As a result of our more accurate malaria records, we were able to demonstrate a threefold increase in malaria contracted outside of Dallas compared with a negligible increase in "home-grown" malaria, thus inspiring the continued confidence of the Dallas public in anti-malaria work.

It is very important to have as complete statistics as possible of malaria, and, of course, that is true of all other disease.

Dr. L. D. Fricks, U. S. Public Health Service, Memphis, Tenn.—I have felt very keenly since beginning our cooperative malaria control work the truth of the criticisms made by Dr. Maxcy: that our knowledge of malaria prevalence in the areas in which we are working is the weakest part of our program. We all realize that, and I was greatly gratified when, after considerable effort on my part, the Bureau assigned Dr. Maxcy to this phase of malaria work, on account of his training in epidemiology and the fact that he will devote his entire time to the study of malaria prevalence in the South.

As was brought out by Dr. Maxcy, we have not given malaria among school children of the South the attention which its importance warrants. They are the new arrivals in our Southern communities where malaria is more or less endemic, and I feel that an examination of the school children will probably give us considerable information as regards malaria prevalence. The careful study of malaria among this group will not only give us information regarding malaria prevalence, but will be of great assistance to the state health officials in carrying out their health programs and in stimulating the interest of the people in malaria control and other preventable diseases.

I was recently very much surprised to see that a card for the examination of school children which was elaborately prepared did not include malaria at all among the diseases under examination and this card is being used throughout the Southern states. That is a grave error which should be corrected.

Dr. C. C. Bass, New Orleans, La.—I have followed or observed the application of different methods of estimating and arriving at the malaria prevalence in a locality, or in a group of people, with considerable interest during the past several years. My experiences and observations have led me to the unpleasant conclusion that we have no method at present by which we can arrive at the exact prevalence of malaria in a community or in a given group of people.

I have been greatly disappointed with the deplorable inaccuracy of diagnoses on the part of physicians, to such an extent that I am frank to say that I have not the respect for, or the confidence in, the reports of malaria made by physicians that I would have had otherwise, and as no doubt many others still have. When physicians are doing their best, they make many errors in the diagnosis of malaria unless they depend upon blood examinations. If they depend upon single blood examinations they fail to diagnose anything like all the malaria carriers. The fact that they have taken quinin just previous to the physician's taking the blood specimen for examination often leads to failure to find parasites in persons who have malaria.

Whenever we deal with any considerable number of physicians there will be one here and there who is so grossly inaccurate in his diagnosis, and in giving the number of cases treated, as greatly to reduce the accuracy of the sum total of the reports.

Although I feel that we have no method by which we can arrive at the full prevalence of malaria in a community, at the same time we can determine a certain prevalence of malaria by blood examinations. There is no way by which we can determine that a given patient has malaria except by examining his blood and finding the malaria parasites. There is no way by which we can determine that a certain per cent of any group of people have malaria except by examining their blood and finding the malaria parasites. And this does not show all of them.

I quite agree that examination of groups of people, such as, for instance, school children, has the advantage of convenience, at least. It also has decided disadvantages. We usually take the blood at a school at one time; probably it is taken on one day. Under such circumstances, those who are sick with malaria are not present and their blood will not be examined. In this way many of those who have malaria are missed by such examinations, which, therefore, fail to show the full prevalence in the group, much less the prevalence in all the people in the community.

My feeling is at present that the only way that we can determine that a given per cent of the people in a locality have malaria is to examine the blood of all the people in that locality. Whatever extent of infection we find, we know exists. We do not know how much more may exist. It will vary very greatly in different seasons of the year, being lower in the winter and higher in the summer. The history of attacks is unreliable, the physicians' reports are unreliable and the blood examination is proof only when it is positive. I do not believe, therefore, that we can determine the exact prevalence of malaria in a community. We can determine *a* prevalence, but not the *full* prevalence.

Mr. W. G. Stromquist, Sanitary Engineer, Memphis, Tenn.—It has been somewhat discouraging to note the increase of malaria in Memphis this year, with a higher death rate than last year, although the mosquito eradication work has been carried on more systematically and completely than before. There has been a similar increase in malaria throughout the Delta.

We have in Memphis the laboratory of the Malaria Division of the Public Health Service, the State Board of Health and the City Health Department, all of which have been combined recently into one public health laboratory. Out of more than 200 cases reported only about 40 per cent had laboratory diagnosis and about 15 per cent have been reported in the form of death certificates in colored people without any laboratory diagnosis or previous reports of the cases.

We had about 200 cases of malaria reported and fifty deaths. We are either not getting complete reports of malaria or we have an unusual fatality rate.

Dr. H. R. Carter, U. S. Public Health Service, Washington, D. C.—For our purpose it is not necessary to know how much malaria you have. If you only wish to compare the condition before and after, you do not care about accurate statistics, providing you have statistics of the same degree of accuracy.

The method adopted at Crossett and Red Lake Plantation in Arkansas depended upon the physicians' reports, and I considered it satisfactory, not that I deemed the physicians' reports reliable, but they were about as unreliable the year after the demonstration as they were the year before the demonstration, and therefore the proportion of reduction, which was what we wished to know, would be approximately right. I suggested that they select the place for demonstration at least twelve months before they commenced operations there; give out cards and get reports weekly from the physicians by taking the cards up for the year before the demonstration was made and for the year after. Neither report would be correct, but one would be about as incorrect as the other. If one was 10 per cent of the other it would be fair to assume that we had a reduction of 90 per cent.

It is not the prevalence of malaria that you want to know. It is the percentage of reduction that you get by your control measures that you are seeking, and if that is the object of Dr. Dowling's statistics it meets the condition fairly well. This history census is nothing like so good as a census by blood examination. The trouble about blood examination is that for the amount of malaria control that we do it involves too much work. It is correct, but it is impracticable.

Dr. Dowling (closing).—I was hopeful that this discussion would be the means of bringing out some suggestions which would be practicable as to the gathering of accurate reports of malaria in the various sections of Louisiana and other sections of the country. I must tell you frankly that we have tried various methods and up to the present time we have been unsuccessful.

There ought to be some way of charging all cases of malaria back to the place in which they originate. I was taken to task because in our weekly report a certain number of cases of typhoid fever which were brought to the city were credited to New Orleans. I sent an inspector to investigate and he reported that the cases had been diagnosed where they originated as ptomaine poisoning. But Charity Hospital had reported them as typhoid. The City Health Officer took exception to the fact that we failed to state that these cases came from one of the adjoining towns.

Apropos of this, one of the health officers in a parish not very far from New Orleans wrote me that we had a case of typhoid fever originating in his county when the case, he said, originated in New Orleans, and he promptly sent it back to New Orleans, where it belonged.

The records of the city of New Orleans show very little malaria originating in New Orleans. If we could devise some means by which the origin of cases of malaria could be determined, we would have a much better opportunity to control it.

PROBLEMS ENCOUNTERED IN MAINTAINING URBAN MALARIA CONTROL*

By C. W. Garrison, M.D.,
State Health Officer,
Little Rock, Ark.

It is a simple matter to enumerate the major problems encountered in maintaining urban malaria control. It is presumed that other essayists have been given the more arduous task of solving them.

Obviously, some of the problems mentioned will be peculiar to Arkansas, as each state and community unquestionably has its own particular limitations.

*Read before the National Malaria Committee (Conference on Malaria), acting as Malaria Division of the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

The first question involved is that of selection. We have made some mistakes in selecting units for control which involved added obstacles for proper maintenance. For the present only those towns should be selected which, after a preliminary survey, are found to be subject to complete control at reasonable cost, and then only after reasonable proof has been secured that the necessary funds will be available for carrying out effective control methods throughout the entire malaria season.

This naturally suggests the next problem: the securing of necessary funds. In Arkansas since the first demonstration was made at Crossett, the policy has been to require the towns to finance the entire project, exclusive of supervision. In a few instances, however, owing to little misunderstandings and unexpected financial difficulties, the State has supplemented the salary of the local inspectors, varying in amounts from $60.00 to $300.00 in one instance per annum.

One of the most vexing problems has been the securing and holding of an adequate number of trained directors to properly supervise the work in hand. A limited number of such directors with an increasing demand for control work, resignation, illness and transfer of personnel by the co-operating agencies, have contributed most to this problem. Not until each state has developed its own resources and employed its own personnel will this difficulty probably be overcome.

The constitution of Arkansas prohibits the issuance of bonds, either by the State, counties or cities. As a result, under the present tax rate limitation, it is difficult or impossible in some places to secure adequate appropriations in addition to the already fixed expenses of municipalities. This necessitates in most instances the raising of funds by voluntary subscription, which is always more or less uncertain and temporary.

Another disturbing factor, which is considerable, is the change in local administration, in other words, politics. One mayor may be a strong advocate and supporter of malaria control and under his regime a very efficient, smoothly working local organization may be in operation, but an unsympathetic mayor may come into office on a platform of retrenchment, pledged to reduce the "tax burdened" citizens and cause innumerable little obstacles to impede progress and reduce the effectiveness of the work being done.

Written contracts or agreements with city officials is another problem. In some places they have been beneficial. It is the judgment of the essayist that the malaria program is rapidly arriving at, if it has not already reached, that stage where a moral agreement between the supervising agent or agents and the local officers is preferable to a written agreement. A memoranda should be submitted, however, for reference in case of misunderstanding or controversy.

LOCAL ORDINANCES

Carefully drawn ordinances to meet local conditions should be passed by the city councils. This involves local stock laws, anti-mosquito measures and reporting of cases. Recently articles have appeared advocating the abandonment of stock laws in order that milch cows may graze the grass and weeds from the ditches and small streams. This movement is in keeping with the theory propounded by not a few old residents in this State that hogs should be permitted to run at large in order that they may act as scavengers for open back privies, declaring that when this was the case there was no typhoid. Cows, horses and hogs have seriously interfered with ditch maintenance in more than one instance. In some instances, efforts have been made to involve the malaria personnel and use the control project in local stock law controversies.

Securing and retaining, throughout the entire malaria season, competent local inspectors and oilers has presented a serious problem in many instances. This has been due largely, however, to general prosperity, to local prosperity due to oil developments, and an inability to meet the wage increase.

Changing economic conditions during the past two seasons have also contributed to this condition, as subscribers to the voluntary fund have been somewhat embarrassed.

Climatic conditions also contribute no little to our problems. Late cold springs and early cold falls have saved the day for us more than once, while the reverse last fall caused our undoing. Continuous showers during the late summer months, insufficient to wash out the ditches and streams, have taxed the local personnel to the utmost, as only a personnel for normal conditions has been provided.

The securing and distribution of top minnows does not offer a serious problem in this State, as they are plentiful, but this is an important item that has not been sufficiently recognized in all instances. In some units considerable expense could have been saved had gambusia been fully utilized. It is simply one of the many details necessary to the successful mosquito control program at the least possible expense.

ANOPHELES VS. MOSQUITOES

Culex and Aedes calopus present a problem all their own. Shall we proceed on an anti-anopheles or anti-mosquito basis? Mr. LePrince holds to the opinion that we should adhere to the anti-anopheles principle, but we have one fine little city in this State that is one of the latest, one of the most enthusiastic and one of the best units, that simply compelled us to assume supervision and has expended about $2700 this year for the eradication of mosquitoes. The citizens contended that very little malaria was present within the confines of the incorporate limits and unquestionably malaria is not so serious a problem as in other localities, but these people were willing to pay the price to be rid of the "pest" and propose extending the control area next season.

While every effort should be made to acquaint the people with the difference in anopheles and anti-mosquito measures, in every single instance where we have allowed the pestiferous culex and aedes to assert their superior ability over the anopheles to evade us, the people have been somewhat dissatisfied, and more or less critical.

Another obstacle encountered is that group of people made up of the agnostic, the miasma advocate and the just plain trouble-maker. While this group is not often large, there are times when they hold the "balance of power" and if not successful in preventing the inauguration of the work may contribute to its discontinuance if the slightest bauble occurs.

Also, there is a tendency on the part of some municipalities to reject the supervision of the central authorities and attempt to do their own control work in their own way, due as a rule to some local celebrity, a physician, who announces that he can conduct the work at great saving to the city. Usually such procedure is disastrous.

The last problem to be mentioned is by no means the least: that is the physicians. Without complete cooperation on their part we have great difficulty in holding the good will of the people or securing the necessary funds, and in measuring our results. Let some one else tell us how to secure their support.

DISCUSSION

Mr. A. W. Fuchs, U. S. Public Health Service, Memphis, Tenn.—I have found two particularly important problems, both of which Dr. Garrison mentioned in his paper, which must be solved if malaria control work is to be maintained successfully from year to year in any community.

The first is to keep the same foreman or inspector on the job in succeeding seasons after he is once trained. Unless such provision is made a new man must be trained all over again the second year and perhaps each succeeding year. This means not only a great waste of time of the field director, but a certain deterioration in the quality of the work as the new inspector will not fully understand his duties until the season is well advanced.

There are a number of ways in which I have been able to retain trained men so that they are available for future seasons, and I presume some of the field directors present have succeeded, in one way or another, in accomplishing the same end. Whatever method is used must generally be based upon the necessity of furnishing the inspector continuous employment for the entire year rather than during the mosquito season only. This may be done by selecting a man who has a seasonal occupation which keeps him employed during the winter. Another method, which has many advantages, is to obtain a city appropriation for a full-time sanitary inspector who may devote most of his time in summer to anti-mosquito work and in the winter to general sanitary inspections of privies, street cleaning, dairies, food markets, etc. For a town of over 5000 a full-time sanitary inspector is not too great a burden. In smaller towns mosquito inspection may be combined with other municipal

duties such as that of street foreman, constable, etc., to give all-year employment to one man.

The second problem I have in mind is the control of culex mosquitoes. I agree with Dr. Garrison that culex control is necessary to insure continuation of the anopheles control program. In the towns where I have done control work it has been judged successful by the public in proportion to the absence of mosquitoes. Freedom from malaria does not appeal to them nearly so strongly as freedom from the mosquito pest. The increased cost of a campaign which includes also the control of culex is worth while, in my opinion, if the continuation of anopheles control is thereby assured.

This condition is very general, but could perhaps be changed in time by proper publicity. Not until the public is educated to the difference between anopheles and culex control and realizes that only the former has a public health benefit, may the field director omit culex control without jeopardizing his program.

Dr. L. D. Fricks, U. S. Public Health Service, Memphis, Tenn.—I agree with Dr. Garrison that the first problem in maintenance is the selection of the town in which we shall work. I feel that with our trained force of engineers we can make a successful demonstration in almost any town, certainly in the great majority of towns that the state health authorities ask us to work in, but maintenance is a different problem. The successful maintenance of the work is a problem that the state health officer should consider his own, because the town that is dropped reacts against the work that is being done elsewhere in his state. We all know that when we started in this cooperative program we had not the time to select properly the best towns in which to work. But the results are splendid in that out of the fifty-one towns selected only six discontinued and these for good and sufficient reasons. I do feel, however, that unless the state health officer properly selects the towns on a basis of continued work, our efforts will be thrown away. One of the fundamentals is that the selection of these towns for malaria control demonstrations must depend upon the extent of the malaria problem and its relation to other local health problems, and that the local community should officially, not through private organizations, contribute to the maintenance of malaria control. If you have any understanding with the local authorities you must have it on the basis of official cooperation and not on the basis of private contribution, and the state health officer in every case should consider that this is a problem of his own. If he does not maintain the work once begun, it is going to react against his health program and his work will suffer correspondingly.

Mr. Frank R. Shaw, Sanitary Engineer, U. S. Public Health Service, New Orleans, La.—The important factor in the maintenance of control work is public opinion. The first problem is that of influencing the officials to institute a campaign, which, I think, should be accompanied by the formal agreement for the continuance of the work. But, since we all know that this agreement will not be effective if the officials do not see their way clear to continue it, we most certainly need public backing. The officials will naturally do those things which will place them in a favorable light with the people. Therefore, an important factor in the initial campaign is so to mould public opinion that even though some of the officials might, for one reason or another, be inclined to drop the work, the pressure of public sentiment will be so great that they cannot politically afford to discontinue it.

This duty devolves upon both the state health department and the men in direct charge of the work. They should study this phase of the situation from the beginning and mould the public opinion and at the proper time get expressions through the public press, so that at the close of the initial campaign the officials will be certain of popular support for this activity. I know of cases where the city officials were enthusiastic and energetic in their activities for the continuance of the work, but this was unavailing in face of unfavorable public sentiment. With limited funds and several activities under consideration, the people chose those other than malaria control and the officials were powerless.

Although I do not claim that I had this point in mind at the start of a recent campaign, I believe we secured enough expressions of public opinion from the civic organizations, through the press and by individuals to the city officials that only a calamity will prevent the continuance of the work there. As a direct result a special budget item for malaria control, separate and aside from the general health budget, was provided.

Dr. H. R. Carter, U. S. Public Health Service, Washington, D. C.—To my mind there is only one problem that comes in for the continuation or non-continuation of the work in an urban community. My feelings were hurt in looking up the table there on the wall in which one state showed a failure to continue of 67 per cent. Two, Mississippi and Alabama, showed no loss, but 100 per cent continuation. The thing is simply the choice of towns. Practically everything comes down to that.

When joint malaria work was instituted it was agreed, and properly agreed, that it was a health officer's work; that whatever agency was with the state health officer was simply an adjunct and assistant of the health officer, and he had the right to choose the town and was responsible for choosing towns in which public opinion and the conditions of prosperity are such that the work will be continued. The state health officer should be careful and painstaking in selecting towns that will continue, and if the towns will not continue the work it is a question of whether he should have picked those or not.

Now, as to whether there should be anopheles control or general mosquito control, the question whether we confine ourselves to malaria control or whether we take in with it the control of the culex for the sake of getting the other work done, it seems to me, should be left to the health officer.

Dr. Ennion G. Williams, State Board of Health, Richmond, Va.—Last summer Mr. LePrince got me very much interested in gambusia. A year or two ago Mr. Hildebrand could not find any gambusia anywhere around the city,

but last spring he visited us and found in one little creek near the city a number of them. Last year I employed a medical student and the City of Richmond detailed an inspector with an automobile; and the two stocked every place that contained water around the city with gambusia. In our public square we had fountains. We stocked them with gambusia and we put up a large sign saying that they were gambusia and they were free, and many people who had ponds around their places stocked them. Every pool around the city now has gambusia and people in adjoining counties have them in their ponds and also some of the adjoining cities. That was a very inexpensive way of controlling mosquitoes.

Mr. E. B. Johnson, Sanitary Engineer, State Board of Health, Montgomery, Ala.—In Alabama in many places practically all the anopheles production is in stock ponds or other similar ponds. We have twenty or thirty gambusia hatcheries, just natural ponds, which we have stocked.

We have a "Gambusia Hatchery" sign. It comes in two sections, nailed face to face with laths between, so that it can be shipped easily. The sections can be taken apart on the desired location, put together to form the complete sign, and erected. We try to get our hatcheries on the most traveled roads and then stick up these signs, where any one going along the road has to face and read them.

They are 48 inches by 42 inches and read:

THIS PLACE IS A HATCHERY FOR
TOP MINNOWS
WHICH DESTROY MOSQUITOES
AND CONTROL MALARIA.
STATE BOARD OF HEALTH.

These words are on a white background and are black except the words *top minnows, malaria* and *mosquitoes,* which are red with black edges. The words *top minnows* are five and a half inches high; the words *malaria* and *mosquitoes* three and a half inches; the words *State Board of Health* three inches, and the others two inches.

We have one county in Alabama in which we are protecting an area of perhaps seventy or eighty square miles with absolutely nothing but gambusia. There is a population of some four or five thousand. They are doing no oiling. They are doing nothing but gambusia control. It has been going on for nearly two years, and the control is perfect. Mr. LePrince and I went over one of the small towns in this district last summer. We did not see a mosquito or find a wiggler.

Mr. Kibby, of the Tennessee Coal, Iron and Railroad Company, has an impounded lake with a shore line of twenty-two miles, with several communities along the edge of it. That pond is most perfectly controlled by gambusia. Last summer we went over several miles of the shore line and did not find a wiggler. That work is permanent and the only maintenance is occasional cleaning of the edges. This fact is a strong point in favor of gambusia. We should all use them wherever we can.

Mr. George Parker, Sanitary Engineer, Jacksonville, Tex.—Dr. Carter said he regarded the selection of towns as an important point. I do not think we should get away from that for one minute. The selection of the towns has a great bearing, if not the most important bearing, on the future work in the state.

I have noticed by the work of the last two years, and particularly in the second year of the control work that I have been connected with, that the old towns have served as a nucleus to work from, and through them other towns are led to start campaign work. These towns were so situated that others within a reasonable radius kept in constant touch with the work that was going on, whether they were skeptical or not. There is also rivalry among some towns. What one does, if it turns out well, the other is going to try to do even better. So we can use that fact in planning work, which also serves to keep the work going in after years.

I do not think enough time is spent in making surveys. Sometimes least strategical towns are selected on this account. I believe twice as much work could be done in five years if two years were spent in making surveys and three in control work. With good statistics, demonstration work is conclusive. With properly and carefully selected towns, expansion and continuance of work is assured.

Unquestionably the anopheles must be controlled to control malaria. In some places mosquito control is insisted upon. I had occasion to control only the anopheles in a village this year with excellent results as to malaria reduction. In another town we had good mosquito control and a 75 per cent reduction in malaria. Early in September a few mosquitoes appeared and caused some annoyance. The Mayor asked if I did not think it was a good time to make an impression by letting a good influx of mosquitoes into the town, as many were beginning to take the work less seriously than in the beginning. Work was stopped for ten days, mosquitoes appeared, and complaints became very numerous and the Mayor had all he could do to get things going again to suit the people. The impression was made and next year's work is assured. This may have been a bad method of procedure, but it served to demonstrate that mosquito control was what was wanted, regardless of the fact that it was generally understood that an anti-malaria campaign was being conducted, and that only the anopheles need be destroyed.

Mr. J. A. LePrince, U. S. Public Health Service, Memphis, Tenn.—I had the pleasure of reading Dr. Garrison's paper before coming here, and I would like to state, regarding the securing of the funds, that it is extremely important that we determine so far as possible what a problem is before we make estimates on it. That includes more or less determining what the weather conditions are going to be. It is impossible to determine that fact, as you know. The worst conditions that can come about, the extremely warm, wet spring, and late warm autumn with plenty of rainfall at the end. It is generally safer to figure upon such conditions, or to let the people of the state understand that should such conditions come about we shall need a certain sum to combat that condition of affairs. Hence, we should ask for that sum, and should

the season be not so bad as we anticipate, the people can be given to understand that a considerable proportion of the estimate will probably be turned back into the treasury. But if we underestimate, it is very difficult to get the money, to get an appropriation to handle the situation with, and those of you who have not met with those conditions will do so.

I doubt whether in all cases we take the general public into our confidence and give them sufficient information. I have spoken to dozens of persons in towns where work is being done and I find that there is too large a portion of the public in the demonstration towns who do not know what we are driving at. During the non-mosquito breeding season we can plan to overcome these difficulties—this source of criticism.

Another point of importance is the question of securing well-trained field directors to meet the demands of the work. When we take a foreman on the job we should have a definite understanding with him that he is going to work during the entire season. He must understand the reason why this work is being done and he must understand that the failure of the work may result in much sickness, and in some cases death, and he must give his word of honor that he will stick to the job until the end of the season's work. It is very difficult to pick up a new foreman in the late summer or early autumn and teach him to run the job. Those difficulties must be anticipated and arrangements made beforehand. It can be done in most instances.

I understand that the constitution of this State forbids the issuance of bonds and fixes the tax rates, and the work has to be done by subscription. There is an opportunity here in Arkansas as there is in other states for a better knowledge of the importance and value of malaria control work's being given to the public. There are many ways of giving it, and when public opinion demands it stronger than it does today malaria control work on a bigger scale will commence. This will come about. The whole question depends upon how much the people want it. If they want it they are going to get it. There is no question about it. The big question is in which way the state health department can bring about "the wanting of it." The question of the change of local administration and the question of politics enter into the malaria control project. I have seen some of the field directors on this work take the trouble to go and see all of the candidates, and irrespective of which way the elections went the incoming officials were favorable to the mosquito work. That means, of course, a lot of work, but there is much that can be accomplished that one would not think was possible along those lines.

There is another factor that we are beginning to understand that many know very little about, and I hope it will be discussed in some of our other meetings here. It is reported in many sections that we have a very high malaria rate this year, and it is a question in my mind as to whether that is due to more anopheles having been produced, or the infected anopheles living for a much longer period.

Regarding the anopheles problem, the mosquito pest problem and the combination of the two, it is a matter that we discuss every time we meet. I am of the opinion that there is more work there to be done by the state health department. I believe that we should have in print a statement that should be given to all householders so that they will understand that problem as well as we do. As a rule we go before chambers of commerce, before the town authorities and publish certain facts in the newspapers, and it is possible that we get our information across to perhaps 10 to 25 per cent of the people. The other people do not understand it, and they do not understand that there are three problems: the anopheles problem, the mosquito pest problem and the combined problem. On the sea coast there is a fourth, the marsh mosquito. It would be a very simple thing to give them the facts so that there would be no question of doubt at all, and then before they undertake a malaria campaign they will understand what it is.

Regarding the rejection of state supervision, why should a town tell us that it does not need any help from the state? The answer to me is that a majority of the people in that town do not understand what the problem is that they are undertaking. We should have information widely distributed in that town so that the public will understand this point: that if they had the assistance of the state health department that they would do better and more economical work. If 80 or 90 per cent of the people understood that, they would not stand for a private campaign, but we are not giving that information to all the people. I think it would be wrong for one state with a town within four miles of the state border line to give that information to its people and another town one mile from the border line in the adjacent state not to give that information out, and if the state health officers in the malaria belt, working in cooperation, could get uniform information to the public the work could be done more advantageously than it is being done. The big question today is, how to get work done more rapidly, more economically, how to get better support for the state board of health, and that comes down to the cooperation of the physician. Get him to secure it. There are those in this room who have been able to secure cooperation, 10 per cent, 20 per cent, all the way up to 100 per cent cooperation of physicians in the communities in which they are working; and I think that in this meeting, or some other meeting, that point should be stressed and brought out so we can all take advantage of the method that is being used in order that it may be applied elsewhere.

Dr. S. W. Welch, State Board of Health, Montgomery, Ala.—I think Dr. Garrison is exactly right in the position which he assumes that the state health officer is only partly responsible. He is wholly responsible in the choice of his personnel and assistants, but after having chosen wisely the personnel, the success of his program depends upon the man in the field.

I greatly appreciate the tribute paid to Alabama by the distinguished gentleman who has just taken his seat, because I know no one other than the revered gentleman before me (Dr. Carter) whose favorable opinion I would appreciate

more than his. The success of that work in Alabama is due to the county health officers and the engineers. I was never a man to reap where I sowed not or make posies of other men's roses. These boys did the work and they are the ones that will bring Alabama to the front.

The introduction into the schools of a public health program by the several sanitary engineers and by the health officers has been the turning point in public health work in Alabama. Wherever you meet high school boys, and often the little fellows, they all know there are several varieties of mosquitoes. They know where to find them. They catch them, put them in glass jars and put fish in there and see them eat the larvae. This is getting somewhere. I have wondered what the common Alabama country doctor is going to do in the next ten years when the high school boys come out of school and know more about malaria than he does, unless we introduce a public health course in the medical curriculum.

The corporations of Alabama, particularly the Tennessee Coal, Iron and Railroad Company, the chief representative of the sanitary department of which is in this audience today, set the pace in Alabama for a long number of years not only in malaria control work, but in the control of filth-borne diseases. I am sorry that Mr. Kibby, who had charge of that work for a long number of years, has been too modest to talk on the several subjects that have been brought up. The work that has been done by that Company has been an outstanding accomplishment and has been worth a great deal to the State program.

One health officer in Talladega County, Alabama, put on this malaria control work. The community was one of those provincial communities such as we have—which is the pride, I might say, of the Southern states—in which the customs had not changed since the Indians left the County. They had no sewer system, pointing with pride to the fact that their fathers had not had such things. Their fathers had lived and died and were buried, and they expected to live and die and be buried there, and why should they introduce such innovations? They had all drunk water out of the same well their fathers had dug and all used open-back privies when they used any at all.

The malaria control work was put on in the public schools and immediately brought about an entirely new viewpoint. The Health Officer has succeeded in having the town sewered, and where it was impossible to get sewers, he has the pail system in active operation. The people are now very proud of their clean town.

Dr. Garrison (closing).—I think all of us will subscribe to everything that has been said, but I think a few of those who have discussed the subject to a limited degree have dealt with the ideal. A practical discussion of the conditions we have now and how we may accomplish the greatest results with the material we hold in our hands is what I desire to hear. I shall discuss a few of the questions in the order that they were brought out by the various speakers.

First comes the selection of an inspector for the entire year. It is obvious that in order to do this it will be necessary to find employment for him with the city administration, preferably as a sanitary inspector. This involves the question of funds available from the city revenue, which in most instances in my State are inadequate to meet the demands already created, and to enable the city to function on an efficient basis.

In reference to anopheles control only, in theory this is good. In practice, at least for the present, I doubt its wisdom. It is my opinion that more towns have made appropriations to get rid of the mosquito pest than for the direct purpose of reducing the incidence of malaria. It would be difficult, if not impossible, to educate any considerable number of the citizens of a community as to the relative value of anopheles as opposed to mosquito control. Furthermore, there is going to be a varying incidence of malaria even though control measures are instituted, and, though we may have anopheles control, if we do not have mosquito control, the public will be quick to say that the infection was contracted locally when in fact it will have been brought in from outside districts or the result of recurrent cases.

Dr. Fricks brought out the point that it was the responsibility of the state health officer to select the towns, and quite a number of the speakers stressed the importance of selecting the right towns, but my experience in this state has been that we are compelled to select, in most instances, certainly in many instances, those towns that can and will meet the requirements. We also have to hold in mind the fact that we must select those towns which may be grouped or because of accessibility to certain units of work in order to supervise the greatest number of units with the personnel at our disposal. As to the question of contracts, I believe my field directors will attest to the fact that, if we had required signed contracts this year, few, if anv, of the towns would have accepted supervision. We have been content to accept the oral pledge of such bodies as chambers of commerce or other groups of responsible citizens, and in some instances that of the mayor alone. These are the conditions which confront us at this time.

I grant you that the responsibility of extending the work, the selection of towns and the general program in any state, rests upon the state health officer, but I am not willing to concede that all of it does under the present cooperative program. The change of personnel, due to the withdrawal of men by the cooperative agencies, especially at critical periods of the work, is a very disturbing factor. I do not censure these agencies, as they are compelled to take care of their own interests, but not until the states are able to employ a permanent staff will this problem be solved.

In order to retain the ground already gained, and in order not to lose public sentinment now obtainable, I strongly feel that, if it is at all possible, the cooperating agencies should continue to assist the various states until this permanent program can be installed.

DIRECT AND INDIRECT ADVANTAGES OF URBAN MALARIA CONTROL TO STATE HEALTH PROGRAM*

By S. W. Welch, M.D.,
State Health Officer,
Montgomery, Ala.

The advantages of urban malaria control to a state program are so numerous and diverse that it is difficult to choose the more important.

(1) Through the eradication of all varieties of mosquitoes from the city and its environs the citizens are relieved of the annoyance and discomfort of these stinging pests.

(2) Through the elimination of the anopheles and stegomyia the transmission of malaria, yellow fever and probably dengue is prevented and the level of community health raised.

(3) Owing to the higher level of health in general and to the absence of chills and fever in particular, industrial groups achieve a larger output and greater earnings accrue to the manufacturer.

(4) Merchants in towns where malaria control projects have been carried out effectively, testify to an appreciable increase in goods purchased by the citizens. This increase represents quality as well as quantity of food, clothing and household equipment purchased. This evidence indicates that a higher standard of living and better business follow in the wake of better health conditions.

(5) Traveling men and casual visitors learn of the work and its results and speak of it enthusiastically to whomever they may meet, thus affording the best advertising to the town without cost. This favorable advertising is certain eventually to bring industrial concerns to the city, as well as increased population drawn from other parts of the state and from other states not possessing these advantages.

(6) (a) The preliminary work for such an extensive health project necessitates a judicious use of propaganda to enlist the sympathetic understanding and support of the best citizens. This work has a distinct educational value.

(b) The cooperation of the school forces may result in the introduction of the Carter Malaria Primer as a text book in the grades and the enlistment of the boys and girls as volunteer investigators and sanitary inspectors. These activities should be used by the teacher in connection with her use of the project method in education. For example, the Panama Canal might be made a great central teaching point around which are grouped lessons in history, geography, civics and health. The home project may be used to illustrate graphically and to vitalize the teaching of all of these subjects.

It will thus be seen that the educational features of our malaria control project may, in their far-reaching results, outweigh the immediate importance of economic and health considerations.

(c) Evidence of the leavening action of these educative features is shown in the readiness with which surrounding rural districts follow the example of the time in ditching, oiling and stocking with minnows, according to the principles laid down by the expert in charge of such operations in the city which is their trading center and an educational center for their high school boys and girls.

DISCUSSION

Mr. E. H. Magoon, Sanitary Engineer, International Health Board, Groveton, Tex.—The work of combating sickness by killing mosquitoes appeals to the lay mind more than other preventive work. Anti-malaria work, which requires sanitation as well as medical treatment, tends to gain more public support of health measures. We need greater publicity in reference to the good that can be done by health work. There is a misunderstanding that is too prevalent in reference to the work of health departments. I believe that the directors in charge of malaria control operations can do a great deal to do away with this misunderstanding and gain support for the hookworm control work, for the nursing activities, and for other work of a state health department. In one section I have been told that the nursing work and other activities of the state health department were much easier to carry out as the result of the previous work that the people were well pleased with. The previous work was the control of malaria.

*Read before the National Malaria Committee (Conference on Malaria), acting as Malaria Division of the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

Mr. George Parker, Sanitary Engineer, Jacksonville, Tex.—In malarious states, or the malaria belt, where malarial fever is the chief disease, proper control has been obtained in sections where control measures have been instituted. In all cases where this work has been done by field directors or health officers, or any one interested in malaria control, it has produced a good effect in the territory surrounding the towns where work was done, and also in near-by towns.

The commercial gain that comes from malaria control is certainly an item that cannot be overlooked. It has been conclusively demonstrated, particularly by the work Mr. Van Hovenberg has done on the Cotton Belt Railway, where he has been able to show what the railroad has gained in dollars and cents from work done in Cotton Belt towns. That is very important.

Dr. Welch also mentioned the traveling man, the traveling public, of which it might be said the traveling man is the advertiser. I have very often talked with traveling men about malaria control, or as it is most generally termed, mosquito control. At times the traveling man is not able to get to his headquarters town at the end of the week to spend Sunday. I have in mind a medium sized town where there is a first rate hotel, and also where anti-malaria work has been carried on for the past two years, that receives many of these week-end visitors on account of the hotel accommodations. It has also been a source of comment for these men to remark on the absence of mosquitoes, particularly if they have just left a town where mosquitoes were a constant night annoyance. In one instance I talked with a man who was curious to know "how it was done," saying that in the town where he lived mosquitoes were a continual nuisance. I explained, but he told me that his town could not afford to spend money for that purpose. I then asked him if he would contribute to a fund in his town to conduct such work, and was told that very little, if any, would be contributed. I then reminded him of the fact that his day's work depended largely on the kind of rest he had the night before, and inquired what extra amount he would be willing to pay for his room at the various hotels if he was assured that mosquitoes would not annoy him, and he said "about twenty-five cents." Under such conditions this man was willing to pay approximately $6.00 per month or $50.00 a year extra in hotel bills to avoid mosquito annoyance. When this and a few other facts were brought to his attention he readily stated that he would be willing to pay his share in his town should a mosquito campaign be contemplated.

The traveling man is certainly a good advertising agent. He is a close observer, and the propaganda that he spreads about the health conditions in any town is bound to come back to the state health department, and it is bound to bring to the knowledge of the state the activities of the state health department in malaria control, which, in itself, is a matter of education that will have a great bearing on what a body of legislators will do in regard to state health appropriations. In the communities in Texas in which I have directed malaria control, some of the men hope to run for the legislature. These men will be in a position to have health work done and secure appropriations to carry it on. They have seen the advantages that malaria control has been and are willing to cast their lot with the state health department and see if such work can not be made state-wide.

One other influence is the advantage of working from a given point, using units of towns for malaria demonstration, from which anti-malaria propaganda and control measures radiate, and gradually extend from community to community. I know of a town that raised $1400.00 in less than a day. They said, "If that other town can do it, we can do the same thing," and they did.

Getting into the schools is a great advantage. For a moment I am going to get away from the urban project. A malaria survey is being made in one of the counties in Texas. Each school district is being visited, a blood index is being made, and an educational program followed. An attempt is being made to have the 73 school districts each establish and maintain a gambusia hatchery and have full charge of distributing the fish throughout their respective districts. This hatchery will be under the direct supervision of the school children. The county embraces about 1100 square miles and has a population of about 37,000. Certainly, with such a movement under way the activities of the state health department must be recognized.

Mr. E. B. Johnson, State Board of Health, Montgomery, Ala.—Dr. Welch brought out three or four points which I think could be enlarged upon. In the first place, the idea that the community actually saves money by malaria control work. Personally, I believe in putting malaria control work on an economic basis. We should not do malaria control work in any place unless we are satisfied that there will be a return of at least a dollar and a half for every dollar spent.

We had one community last year in which we made a house-to-house canvass twice during the year. The figures given by the people show that in 1919 they spent for doctors, quinin, chill tonics and loss of wages, $26,245. We did some malaria control work in 1920 costing $3000.00. That year malaria cost them (again according to their own figures) $521.00. In other words, they saved $25,724 on an investment of $3000—a return of over 700 per cent. These figures have been an important factor in influencing other places in Alabama to do work. We have been able to show other places these figures with the endorsements of the Demopolis officials and we have had other places put on the work simply because they saw that it paid Demopolis.

Another bit of education: we have introduced the Malaria Primer in every school where we are doing work, that is, in all where we possibly could place them, which was nearly all. The boys and girls are very much interested. In one place we gave them an examination on the book and they knew it from cover to cover. In fact, they found things I did not know were in it myself.

One day some boys saw us under a railroad bridge with a test tube trying to find some mos-

quitoes and the Health Officer told me that for a week afterward he was pestered by boys asking for test tubes. He would find boys early in the morning under bridges hunting for mosquitoes, and when they found a lot, they would come and tell him. He said he was able to keep a good check on his work, because these boys were interested and found things even better and more quickly than his inspector.

To me, the biggest advantage of malaria control work in communities is the effect on the surrounding rural districts. Most of our malaria is not in communities, but in the rural districts, and it is in the rural districts that we need to interest people in malaria control work. We can do this by ridding the trading centers of mosquitoes and malaria. We put on some work in Talladega City this summer. Within a radius of ten miles of the city several property owners have done some wonderful control work, merely because they saw what had been done in their trading center.

Some time ago I went out of Tuscaloosa on the Mobile and Ohio Railroad, and in the first fifteen miles I saw seven pieces of excellent drainage work. Later the property owners told me they did it to get rid of mosquitoes. Their trading center was Tuscaloosa, where we did malaria control work.

When the farmer sees his trading center free from mosquitoes and free from malaria he begins to think of making his farm the same way.

Mr. Frank R. Shaw, Sanitary Engineer, U. S. Public Health Service, New Orleans, La.—It occurs to me that the most important factor of the state health officer's program was mentioned by Mr. Parker, that is, the matter of appropriation.

Every man, whether he be a business or professional man, is concerned with dividends. The first question in his mind is: will the activity bring returns commensurate with the investment? It is true that there are benefits other than financial to be gained from health work, but cash return speaks loudest and such can be shown for this work.

In the matter of appropriations, legislatures can best be influenced by facts and figures which show the dividends to be derived. If every state health officer could go to his legislature and by definite data show that the expenditure of a certain fund during the previous year had brought about the saving of several times that amount to the people, it would not be difficult for him to get renewed or additional apropriation.

An advantage of malaria control is that the financial saving can be quickly shown and such will easily be the means of arousing interest in other activities. After a successful campaign of malaria control it will be much easier to convince city officials or the legislature that results can be secured from investments in control of typhoid or anything else.

Another advantage is that the field activities will bring to the attention of the people their negligence in sanitation and prompt their action along other lines. This is especially true where mosquito control is included and systematic premise inspections are made. The correction of private drainage, the destruction of cans and general clean-up certainly has a bearing on general health. A particular instance of this was where the general premise clean-up caused an individual to observe that his sanitary can was very insanitary. He came to my office and in his broken English explained his purpose and to my knowledge made the correction. His health conscience had been aroused by the malaria work, as was apparently the case with others. For this reason malaria control work has a direct advantage to general health work.

Dr. T. H. D. Griffitts, U. S. Public Health Service, Norfolk, Va.—If we look at the title of this paper, "Direct and Indirect Advantages of Urban Malaria Control to a State Health Program," it will appear that those who have discussed the paper have not stayed close to the subject. It seems to me that this paper could best be discussed by state health officers who have not a malaria program alone but a definite state health program. It is the influence of malaria control work in urban communities that we are now considering—how urban malaria control may affect, directly or indirectly, the general health program of the state. I should regard it as unfortunate should we pass up this subject without hearing more from the state health officers who are present.

The feeling is growing—and the same thing was brought out in the resolution that was introduced this morning for the conduct of this general Association—that we should give those who are especially interested in one section an opportunity to visit another; that it is not to our advantage to get too highly specialized in any branch of the medical profession; and this thing applies to general health work. I have the feeling, then, that the time is ripe when this question of malaria control should become an integral part of the local health work just exactly like hookworm work, the prevention of typhoid, smallpox or other communicable diseases; in other words, I believe we have arrived at the time when the local malaria problem should be taken up, interwoven with the other health matters and handled by the local health organization. If malaria is prevalent anywhere, that fact should be utilized to help establish or build or strengthen the local health organization in the community. I believe if you make your malaria work a part of the state health program it directly and indirectly favorably affects the general health program of the state.

Mr. J. A. LePrince, Senior Sanitary Engineer, U. S. Public Health Service, Memphis, Tenn.—I have visited states in various parts of the South and I find, particularly in Alabama, that this urban malaria work is resulting in a very marked extension of their work out into the rural community. It would take a half an hour to explain the extent to which that extension, you might say, is taking place, but I strongly recommend to our workers who happen to pass through Alabama that they spend a day there and just see the effect of the work that is being done. There is no state health officer or assistant state health officer in the South, or the malarial part of our country, who could not gain some very useful information by making a short visit to those parts of Alabama where that influence is spreading so rapidly.

RURAL MALARIA CONTROL WITH THE COUNTY AS THE UNIT*

By Ennion G. Williams, M.D.,
State Health Officer,
Richmond, Va.

Our first effort in malaria control has been and, I am afraid, will for a long time continue to be, a striving to eradicate firmly cherished delusions concerning the disease itself and the methods of its transmission.

Sir Ronald Ross, who first gave to the world the true story of malaria infection, lamented years afterward that mankind had not taken advantage of its opportunities to improve health. That lament can be repeated by us today; and it will be chanted by health workers until the world has grown incalculably older.

But, even appreciating this condition, we are frequently surprised, sometimes astonished at the tenacity of certain misbeliefs in relation to malaria. The most common one is, of course, the strict translation of the word employed to designate the trouble, mal-aria, bad air. It would be rather amusing, if it were not so depressing, to note the many who refuse to consider the mosquito at all in connection with the disease, but attribute the whole trouble to night air, particularly to night air that is laden with vapor. This and the delusion about sewer gas are the most difficult to dispel.

There are three "M's" to malaria, the micro-organism, the mosquito and the man. If the connecting link, the mosquito, does not act as a mobile bridge between the germ and the victim, malaria can not be transmitted. All of us understand that, and it is so simple that a child should be made to understand it without placing an undue tax upon the infantile mentality. Still our main trouble is to fix this clearly in the public mind.

With malaria, as with other diseases, there are several methods of attack. We may start with the elimination campaign against either the germ or the carrier or we may elect to pursue a combination of these efforts. In many cities within the malaria zone it has been demonstrated that malaria control is economically feasible and strikingly effective through efforts to eradicate or minimize the mosquito population. The success of these efforts has been gratifying to the pride of the malaria worker and pleasing to the city which had undertaken the work; but it has been rather disheartening to find that the country district contiguous to the city is not apparently much interested in the result.

There is an obvious reason for this attitude, entirely aside from the general ignorance regarding causation. Least of all the acute communicable diseases does malaria lend itself to a control through the media of health rules and regulations. With the more virulent diseases, such as smallpox, typhoid or diphtheria, there is always a confining sickness and a consequent medical supervision that gives opportunity for the enforcement of regulatory measures. People do their own doctoring for malaria unless it reaches an acute stage. The community generally does not know just how prevalent the disease may be. The health board of the locality is never adequately informed. Consequently effort with individuals is almost invariably necessary for the creation of sentiment favoring malaria control work in rural sections.

And malaria is more essentially a rural than an urban disease. The general character of city improvements, their drainage provisions, the absence of pools or lakes, the regulations against stagnant water, the better construction of the houses, the care of drains and gutters, all these make it difficult for the mosquitoes to get good breeding places. But in the country these insects thrive and multiply without let or hindrance, unless there are definite activities undertaken against them.

In Virginia, as I believe is the case in other Southern states, we have assumed that malaria is widely prevalent in many sections, but accurate data on its general prevalence are lamentably lacking. We must know when, where and under what circumstances malaria is occurring as a basis for intelligent, concerted action

*Read before the National Malaria Committee (Conference on Malaria), acting as Malaria Division of the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

against its inroads. It is obvious that by whatever administrative machinery we advance against malaria in rural sections, we must (a) determine in the best way applicable the location of cases and their environments, (b) instruct the people as to the exact way malaria is transmitted from person to person, and (c) render them such advice and assistance as is practicable to the end that the people themselves may largely accomplish the things they must of necessity do in the protection of their own health and lives.

Under (a) we must proceed in accordance with the local organization, existing or to be established, for doing health work in the county. With a health department, health officer or sanitary officer in a county where malaria prevails, anti-malaria activities can become an integral part of one work of such officer or department as is work against the other communicable diseases.

At the present time there seems to be no striking short cut to an accurate determination of the malaria incidence and its attendant loss. As an initial means to determine more fully than is possible through reports by physicians, and, I might say, in addition to physicians' reports, we have taken three counties in Virginia in which we are making a house-to-house canvass either for the entire county (as has already been done in James City County and is being done in Isle of Wight County) or in only a malarious district of the county, as has been done this year in Greensville County. These counties are selected as representative, and by this survey it is hoped to gain information as to what we really have in the country districts, so that we may determine more accurately the most practical manner or plan by which rural malaria control on a county basis may be done. At the same time the true anopheline-malaria story is being driven home to the people in a very practical way. They are told that mosquitoes are responsible for malaria and they see larvae that make the mosquitoes. They are told that watermelons and fodder and muscadines and chinquapins and "night air" and decaying vegetation and going in the "old swimmin' hole" on Sundays are not the cause of malaria. The habits of mosquitoes are discussed. They are told that a sixteen-mesh screen well installed and properly used will prevent mosquitoes from giving them malaria, that draining of standing water will get rid of, or lessen, malaria mosquitoes and they are told how to treat water that will collect; they are advised that the taking of quinin, 10 grains a day, for sixty days after the "chills" let up offers a means of permanently curing them and protecting others from like infection.

Ponds are examined for the presence of top-feeding minnows and the people are informed that permanent bodies of water may be made practically safe by introducing therein this valuable ally in malaria prevention. The greatest stress is put upon proper screening of dwellings, for in this they are to increase personal comfort, aside from keeping away typhoid fever, protecting the babies from diarrheal diseases, etc.

It is not the idea to overwhelm the recipient of this information, but rather to impress him with a few salient points, particularly that man and mosquito are the creatures that are solely responsible for malaria. Once we can get these facts fixed in the public mind, the health officer will have an easier time. The most essential part of our work is to reach the people and to drive home in the best way, or ways, concise and lasting information as to the prevention of malaria.

Let me say something as to the rural work started in Virginia. A section in Greensville, a portion of Zion District, has sustained a reputation for much malaria. The area is known as the "low grounds," and the people have regarded it as philosophically as they have the saying about a dog with fleas. It is low grounds and must have malaria. This section has had so much malaria that the rest of Greensville County is said not to be malarious. Under a cooperative health program for certain counties this county has a full-time non-medical sanitary officer. Until this year he has been concerned in work against the so-called filth-borne diseases. In the Zion District little could be accomplished in this respect, as the people recognized malaria as their

most serious condition. Standing out in bold relief in the low grounds was the need for assistance against malaria. During the fall of 1920 a survey of part of the District was made by Dr. T. H. D. Griffitts, U.S.P.H.S., cooperating with the Virginia State Health Department, and the Sanitary Officer, Mr. R. A. Deal. The prevailing species of anopheles were quadrimaculatus and crucians, with the former predominating, their breeding areas being the pools in the large swampy areas and a large mill pond which had been raised to a new water level by raising the dam. The latter was well stocked with Gambusia affinis, although their efficiency was thwarted by much overflowed, vegetation-covered flat lands.

The Sanitary Officer took up the malaria work of house-to-house visiting on April 15, carrying on his general work in the county as a secondary consideration during the malaria season. Many of the people acknowledged that they had never before heard that mosquitoes caused their malaria. The people took exceeding interest in the subject, and a number of the homes have been screened.

In brief the report of the first visit of the Officer shows:

Number of homes visited	185
Population of these homes	1134
Number cases of malaria, 1920 and carried over	132
Percentage of population infected	11.6

A resurvey of 181 homes has been made, and in these 20 cases of malaria had developed this year from the time of anopheles activity till October 1. The Officer is now making the third round of the homes for this season.

It has been found to be a conservation of time and energy, in having screening done, to encourage first the community leaders to screen properly. Some people will do things because Mr. So and So has done so. Another good educational measure has been the screening of the County Home, where a case of malaria had just developed. The County Supervisors readily furnished the material and the Sanitary Officer screened the Home, fourteen windows and five doors. It cost the County only $18.00. It was a most satisfactory demonstration.

The second county, where somewhat similar work has been taken up, is James City County. This is the first and only county wherein every home has been visited for anti-malaria purposes. Incidentally, it was at Jamestown Island, in this County, where, it is believed, the first malaria problem developed in this country, in 1607. The County is sparsely settled today, and extending as it does into the Chickahominy Swamp of Civil War fame, it was still regarded as malarious. However, out of a rural population of approximately 3500 there were obtainable histories of only 55 cases of malaria during the previous year, or a malaria morbidity of 1.5 per cent. Most of these were in the region of the Chickahominy Swamp. Organized health work has not been done in this County. Last year the Professor of Public Health in the College of William and Mary, Williamsburg, was made County and City Health Officer, and through the great interest of Dr. Chandler, President of the College, in health education, students of the College were utilized in making the survey of the County, under the direction of Professor C. D. Hart, the Health Officer. The students were given free room and board and free tuition for the year for their services. The State Board of Health furnished their transportation and the County supplied gasoline and oil for the automobile. It is planned to do this character of health work with college students each year. It is a means of vitalizing health instruction in the college and at the same time doing health work in a county where otherwise it might not be done. Of the 472 homes visited, 196 were white and 276 were negro; 305 homes, or 65 per cent, were in some manner screened; in 35 per cent no attempt at screening has been made. Many of the better type of homes were found to be well screened. It is gratifying to know that in what seems to be an average county even 65 per cent of the homes are screened, or the people are thinking of the value of screens. They need encouragement and assistance in obtaining effective screening.

In Isle of Wight County (this County and James City County are in the Coastal section) similar work is being conducted by a field director of the State Board of Health, as the County at this time has no

health officer. Hardy district is the first section in which the work has been taken up. A summary made up to November 1, 1921, by Mr. Clarkson, Field Director, shows:

Number of homes surveyed	770
Number of homes where malaria developed in 1920-1921	140
Percentage of homes infected	18.0
Population surveyed	3588
Number of cases of malaria	201
Percentage of population infected	5.6
Percentage of infected homes within one mile of swamps and ponds	94.0
Per cent of malaria in homes without screens or only partly screened	88.0
Per cent of malaria in homes fully screened	12.0
Per cent of homes fully screened	25.0
Per cent of homes partly screened	42.5
Per cent of homes without screens	32.5

The Field Director states that as one result of the work so far thirteen homes have been screened in this district.

In the three counties, aside from the collection of data and personal instruction given, terse literature is left at each home and the householder is asked to notify the health officer if cases should develop, or if he can in any other way be of service in the correction of conditions, farm drainage, screening of house, etc. Whether malaria exists or not, advice is given that in all cases the continued use of quinin after acute malaria symptoms is necessary under the advice of the physician.

In conclusion, we desire to attack the rural malaria problem in the least artificial way possible. It is realized that the malaria "specialist" or expert has an important part to play in the study, investigation and control of malaria. His services are indispensable in the training of officers who are to direct local health work. Every county health official in sections where malaria exists should be trained in malaria control, just as he is trained in the control and management of affairs relating to other communicable diseases. For the ultimate good, then, let the local health organization be its own malaria organization utilizing and welcoming the aid of the State Health Department and the United States Public Health Service in their advice and assistance. Another advantage in considering malaria simply a part of the general local health work is that it adds importance to the health organizations and assists in developing them in counties where systematic health work is lacking or lagging.

There are many important phases of the question of rural health work that might properly be discussed under the title of this paper, but only one other shall I take occasion to mention: the strong potentiality existing in our rural public school for the betterment of malaria conditions, as well as general health conditions. Health education in the schools is of profound importance. In addition, through the schools a personal touch is had with practically every country home daily for a great part of the year. And so opportunity is offered for a better collection of valuable data on the development of malaria in the county.

DISCUSSION

Dr. S. W. Welch, Montgomery, Ala.—The subject under discussion has been adopted as a part of the health program in Alabama and is now a part and parcel of our projected organization work. Our county organization consists of a minimum personnel of a health officer, some one to take care of things in the office and a rural inspector, or a public health nurse. The work undertaken attacks first the problems peculiar to the South, the filth-borne diseases, typhoid fever, hookworm, dysentery and malaria.

The next proposition is school examination and follow-up work. It ought to be the object of every state board of health to convince the appropriating powers of the economic value of public health work, and that money invested in this enterprise pays the largest dividends of any money appropriated by them out of the tax fund. We are trying in Alabama to take an area of not less than twenty counties, in which area we are making a special effort to eliminate hookworm, typhoid fever, dysentery and malaria infection. If we do this we can go to the Legislature and to the several courts of county commissioners and point to this concrete achievement. We can point to the fact that areas in the South free from those diseases which go to make up the South's peculiar problems increase in taxable values and farm land values from 25 to 100 per cent. We shall talk to them then in language which they can understand. An increase in appropriations will be easy to obtain.

Dr. H. R. Carter, U. S. Public Health Service, Washington, D. C.—Dr. Fricks asked me this morning after breakfast to take part in the discussion of this paper. I can only think he was actuated by the same class of motives that influenced a very eminent Secretary of State who appointed Mr. Metcalf Governor of the Canal Zone as against Colonel Goethals. Mr. Metcalf

had never been in the tropics and knew nothing about the Canal Zone and therefore would be perfectly impartial, and Colonel Goethals had been there for many years and naturally knew something—maybe too much—about the Canal Zone. I open the discussion, then, because I know nothing of the subject and thus doubtless will have an open mind.

Dr. Williams omitted to state that Virginia was one of the few states in which rural malaria control had been done, not county-wide, but for small places. In my earlier work for malaria control we took up, not the urban places, but small settlements with farmers around them, and the State carried out the work in distinctively rural communities. Virginia is remarkable for its very small number of towns and villages in proportion to the number of farm houses. There is a farmhouse here, a farmhouse there, a farmhouse yonder. Dr. Williams spoke of the advisability of village and small town malaria work; that such work was done in Virginia; that the disease was disappearing there rapidly; and that they were not so much interested in it as previously. It may be malaria in general is lessening, but in my State, unfortunately, in some places at least, it is increasing, and has increased markedly since the Civil War. That is true of Halifax County, of Norfolk, of Dinwiddie, of Prince George, of Hanover and along the Potomac—all along the Potomac—and certainly the Lower Peninsular.

In the Lower Peninsular was the first settlement of English people in America. They have very little malaria there. One reason is possibly that it is practically unpopulated. The white man is conspicuous there by his absence. You can go for miles and see nobody, and very many miles without seeing a white man.

Unquestionably, malaria in its end is a rural problem, not urban. We have not attacked it for large cities, but for little villages or for small towns which were practically rural.

The reason the town or village was taken first was that we tried solely anopheles control. Now, whenever we spend a dollar and get eighty cents it is bad sanitation as well as a bad investment. When we spend a dollar in malaria work we ought to get at least five hundred cents' return. To get under 300 per cent is poor work. The cost of anopheles control, other things being equal, is naturally in proportion to the area to be controlled. The value of the control is in proportion to the amount of malaria, the percentage of its reduction, and the number of people affected. The area around a town, say, of a thousand people, is not much greater than the area around three or four farmhouses. Therefore, the expense of a very small rural control would be almost as great as that of a village or town, whereas the benefit derived would be very much less.

Dr. Bass did rural sanitation for malaria on a large scale not by anopheles control, but by sterilization of the human host.

We can not tell how the country-wide method will succeed, but I pray it will turn out half as well as the method of control that we have used for the small towns and villages. The country is the place where malaria exists; it is the country in the long run that we shall have to protect.

We are able to control anopheles breeding places as much as is reasonably, economically possible. The screening of houses has become practicable and we can depend upon the use of quinin. Those three things are the tripod upon which we should lean.

Dr. T. H. D. Griffitts, U. S. Public Health Service, Norfolk, Va.—I would like to touch a few points in connection with rural malaria control. I believe from the start that, instead of applying the term "county-wide" malaria control we ought to call it rural control. In most of the sections of the country where I have been there are no county-wide malaria problems.

I think it was Mr. Parker who this morning brought up the question of thoroughly surveying, preceding control by any method. A very important part of this work is the investigation that has been made or should be made. We have been guessing very largely. As far as I know there is no more accurate method of the determination of the amount of malaria than by making a house-to-house visit in rural communities, and at the same time to try to touch some of the salient features of malaria transmission and prevention. We must not overlook the importance of the school work and frequently a lecture in the school or an examination of the school children will give us an introduction into the rural sections where we have to inaugurate a house-to-house campaign.

The point raised by Dr. Bass, lack of mentality of the class of people we have to deal with, is always to be considered. I remember in one state last year, in talking to a man whom I found had moved from farm to farm every year or two, I asked him if he did not think it was important to screen his house. He said "Yes." He could not "lay down" and take a nap in the summer time without being troubled by flies. I suggested that would be one reason, and I said malaria would be another. I said you get it by the bite of the mosquito. He said, "I have heard that. Well," he said, "I did have malaria in about five places I have been and I did lose one child at the last farm I lived on before I moved here." That is how seriously they consider the malaria problem. He thought he had lost that child by some other means. He did not think he was responsible. He did not have sufficient intelligence to feel responsible for it.

It is part of our duty to help people discriminate in such instances between Divine Providence and devilish mosquitoes. Regrettably frequent are we apt to find that negroes will take up the work that you want done more readily than the low-grade white man. I have been surprised to find the number of screened houses on farms owned by negroes. One of the best screened houses I have seen in North Carolina was a negro's house. He built it, a beautiful little cottage, a flower garden in front of it, and he said that he had done everything that the county health officer told him to do. He had full-length screens on his windows, sixteen-mesh, perfectly fitted, and the doors likewise installed. He had everything screened, I think, except the top of the chimney. Well, being a Southerner, I

hate to acknowledge that the negroes can get ahead of the whites, but I do have to acknowledge that that negro had a model cottage. I saw the most beautiful lightning rods on top of the house that I had ever seen, and I asked the colored woman why they had the lightning rods, and she said a man came along and sold them to the "old man." He said: "We kind of took him like we did our health officer. Whatever he recommended, we put on our house." I replied, "Do you know the good that lightning rods do?" and he answered, "Well, they say they keep lightning from striking your house." I told him three things that lightning rods are reputed to be good for. One thing, they keep lightning from striking twice in the same place; the other is they separate the thunder from the lightning, and another, they serve to tear the pants of Santa Claus when he comes down the chimney, and, I continued, "aside from those three things, lightning rods do not do much good."

I do not advocate the lightning rod man's methods in doing public health work, but I do say that our health educational methods are faulty when people are still buying lightning rods to protect, as Lincoln once said, "against an offended Providence," and do not know that proper screening and the use of screens will protect against malaria as well as being a protective measure against typhoid, dysentery, etc.

There has been a good deal said about Alabama, and I am very glad to see the extension of the urban work into the rural sections of that State, as reported. My experience has been that it does not spread very much. The farmers will do a certain amount of ditching, but most of our rural malaria control work for a few years is going to be by screening rather than by other methods.

Dr. L. D. Fricks, U. S. Public Health Service, Memphis, Tenn.—We are all in perfect agreement that malaria is a rural health problem. Therefore, I am strongly convinced that its solution will rest upon work done by the county health unit. I do not see that we have any other material to work with, and to me the most significant thing in our present campaign for malaria control is the announcement made by the State Health Officer of Alabama that he is now formulating a program for malaria control in twenty counties in Alabama. The same movement is on foot in Mississippi, in Virginia, and in North Carolina. To me that is the most encouraging development of our cooperative work.

Dr. C. C. Bass, New Orleans, La.—My studies have been chiefly along only one line of malaria control, viz., the cure of malaria carriers. In listening to the paper and to the discussion, I have been reminded of the impression that seems to be general, and I am sure is quite the correct view, that the malaria problem is really a rural problem and not an urban problem. That there is malaria in the towns located in regions where malaria is prevalent in the surrounding country is certainly true. In some of those towns the amount of malaria is considerable, but the question has frequently arisen in my mind to what extent malaria would continue in the towns if it were not for the malaria in the surrounding country. I feel very confident that it would naturally be reduced considerably if such a condition should come about.

My experience and observation indicates to me that there are certainly very great difficulties ahead of those who undertake to control malaria in rural sections, dealing as they must with the usual ignorant class of people. In most localities where malaria is prevalent, the most extreme ignorance is also prevalent. Educational measures under these circumstances are not easily carried out. We may be able to get results in towns with the more intelligent class of people, but when we deal with the extremely ignorant class of people we have an entirely different proposition, whatever measures we seek to apply. They are more or less suspicious of your motives. They can not realize that any one is going to come to them and offer them advice with the motive that we have.

With regard to the methods of malaria control in rural sections, all of them surely are valuable. It does not take a great deal of propaganda to get some people to screen their homes. To that extent malaria will be reduced. It does not take much propaganda to get some of the progressive class of people to clean up their premises and reduce anopheline production. That will also do good as far as it goes.

However, curing infected persons is certainly a most valuable method. There are definite limitations to this. It is not possible or by the most intensive surveys practical to discover the infection in all the infected persons in a locality, and it is not possible to get all persons found infected to take the necessary treatment to cure the infection. I know of no instance in which it has been possible to make anything like 100 per cent of people found infected take proper treatment. They are not interested to that extent. However, these limitations should not prevent following the method.

In sparsely settled rural localities it should be less expensive to cure those who have malaria in a home than to prevent mosquito production in a sufficiently large area around the home to prevent transmission. Under such circumstances it is possible that cure of infected persons may be the least expensive of the several methods of malaria control available. In towns the reverse may be true.

I wish to call attention to one way of controlling malaria to a considerable extent that does not cost anything. The physicians of the country treat a large percentage of the people who have clinical attacks of malaria. Many people treat themselves, it is true, but a great many are treated by physicians. They have the advice of the physician one or more times and frequently many times during the year. He usually treats the clinical attack and discharges the patient without adequate advice as to cure of the infection. In a few days, or a few weeks, he may be called to treat the same patient again for a relapse due to failure to cure the infection previously. A person is a malaria carrier and a potential source of infection to others as long as he is not cured of the infection.

Not 25 per cent of those treated by physicians for malaria are cured of their infection by the treatment they receive. Ten per cent would probably be a more correct estimate. If the

physicians of this country would cure their cases, there would necessarily be a corresponding reduction in the prevalence of malaria.

In Bolivar and Sunflower Counties, in Mississippi, we estimated that the physicians treat from 20 to 25 per cent of the clinical malaria that occurs in the country. Therefore, you could theoretically reach 20 or 25 per cent of the malaria in the county through the physicians. It should not cost anything to control malaria to this extent in this way except what it may cost to induce the doctors to do what they should for their patients. Some effort has been put forth in this direction and I believe that many more doctors are now advising their patients to take the standard treatment for malaria, for which this Association is largely responsible. If we put forth further effort in this direction, I believe it would accomplish a great deal at little cost.

Dr. S. W. Welch, State Health Officer, Montgomery, Ala.—Dr. Coogle followed up the work of draining ditches and screening in five counties in which we did malaria control work. He followed it up with the quininization method and did it very successfully. He had five counties and did very excellent work in four of these. The fifth one was not quite so successful. He was detailed by the United States Public Health Service to do this work, and we expect next year that the Service will be equally as generous as it was this year.

Dr. C. P. Coogle, Acting Assistant Surgeon, U. S. P. H. S., Memphis, Tenn.—In Mitchell County, Georgia, during the summer of 1920 we worked upon the problem of county-wide malaria control with a central headquarters, in a manner similar to the proposition just discussed by Dr. Welch, and while the work of one season can hardly be considered conclusive, unquestionably a great deal was accomplished in the way of malaria control. I believe that quinin sulphate is one of the most important, if not the most important, agent which we can employ in county-wide malaria control. It is the most effective remedy we have to offer the public in curing them of malaria infections at the present time; and it is believed that the preparation of this drug in a uniform manner of standard and adequate dosage will result in widespread benefit to the rural communities of the South. Judging from our observations in Mitchell County, Georgia, and the results accomplished there with a very limited force, I am decidedly of the opinion that malaria control can be feasibly conducted with the county as the unit of control wherever the malaria problem is of sufficient importance to warrant an expenditure for this purpose.

Dr. H. R. Carter visited the territory in which we worked the year before this campaign for county-wide malaria control was undertaken by us, and he knows approximately what the malaria situation was in Mitchell County during 1919. Our county-wide work was begun early in the spring of 1920 and continued throughout that summer. In 1921, several months were spent by me in making a malaria survey of the school children of Mitchell County, and while no detailed observations were conducted relative to the decrease in malaria during 1921 as compared with 1920, unquestionably there was a very extensive reduction during 1921. It is my opinion that during this year there were only a few hundred cases of malaria in Mitchell County as compared with several thousand during 1919 before our work was undertaken. It is not claimed, however, that all of this reduction was due to extensive quinin administration. A part of the reduction is undoubtedly due to a dry season and part to education in malaria transmission.

IMPORTANCE OF AND FACTORS TO BE CONSIDERED IN SELECTING NEW TOWNS FOR MALARIA CONTROL DEMONSTRATIONS*

BY JAMES A. HAYNE, M.D.,
State Health Officer,
Columbia, S. C.

It is very interesting to me as a medical man to meet with engineers. The engineer that we have in South Carolina (sanitary engineer) says that when there is anything to be done, he gets a job. That is due to the efficiency of the engineers and their willingness to work. I have found that the chief function of an executive officer is to surround himself with men who know what to do and see that those men do something and then take the credit for all that they do. Having initiated this custom, I find that South Carolina has been very successful in the control of malaria.

The first factor that occurred to my mind in preparing this talk—and it arose on account of the discussion that we had last year—was the per capita cost of the work. It struck me that the very first and fundamental thing was to find out whether there is much malaria present or whether there is not. Of course the per capita cost of sanitating Chicago would be very little, or of sanitating some town in England where there is no malaria. But if you go to sanitate a town in which there is much malaria, then your per capita cost may be a very large per capita cost because you are doing a great deal

*Read before the National Malaria Committee (Conference on Malaria), acting as Malaria Division of the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

of work. So the first thing is to have a careful survey of the town made that you propose to relieve of malaria and determine by every method available whether there is malaria present or not because you are going to find this thing come up after you have done your work and cleared the place of malaria if they never had malaria. Now, you have got to get the fact that there is malaria and get the resident to admit that they have malaria so that later on they cannot go back on their former statement.

That is where the medical man can come in and assist the engineer, because the medical man can make a very careful survey of a town to determine whether malaria is present. After using the method of taking blood specimens and determining whether malaria was present, or examining the spleen, enlarged spleens and finding how many patients had malaria, the engineer can go to the physician and ask how many cases he has had. Of course a physician is not going to tell you he has not any cases of anything, because he does not want you to think that he has no practice, and if you go to him and ask him, in a malarial community, "Have you had any cases of malaria?" and he says "None," why, the natural conclusion is that he has not much practice, and you will find that the physician will exaggerate the number of cases. For instance, we had a physician who said he had two hundred cases of malaria in one town. When we pinned him down to facts he admitted that he had twenty. He said that would be violating professional confidence and we could not get any names at all. So the element of veracity in a physician must be taken into consideration.

The next thing, after having found out the amount of malaria admitted in a given town, is the spirit of that town. Is it a dead town or is it a live town? Is it a town that, after the work is undertaken, will continue the work, or will it let it lapse after you have done it? That is an extremely important factor, for what is the use of spending a lot of money on malaria and then not having the work continued?

Another important factor is whether the medical profession will cooperate. We have often overlooked that question in doing our county health work. We have gone into a county, sent a competent man to do the work, and he failed to get in touch with the medical profession of the county—failed to get their cooperation—and although he did good work, the work failed because he did not obtain the cooperation of the medical profession. You know the doctor is extremely autocratic, probably the most autocratic individual in the world. He goes into a sick room and makes a diagnosis and if he says the patient has typhoid fever or any disease that he may diagnose, he is going to stick to that diagnosis, and he is going to be very much offended if anybody differs with him. So I rather advise a consultation, especially in rural districts and where dealing with very small towns, so the very first proposition in a town is to go to the medical society of that town, or the community, go into a medical meeting, and get the promised cooperation of that medical society. If you can get that and get their whole-hearted backing, you will accomplish a great deal in that town and your work will be appreciated.

The next thing is whether there is a chance to arouse interest in general health work. My experience is that we are too prone to specialize in different classes of health work. For instance, the bureau doing child welfare work specializes in child welfare work and the bureau doing malaria control work specializes in that work. We must find out whether we can get that town aroused so that it will establish a health department and make that a part of the results of our work in getting rid of malaria. We have had one instance in South Carolina where we had an engineer and we got an opportunity to go there for the purpose of doing malaria work, and the result of his excellent and efficient malaria work was that he established the best city health department in our State. The letters that we got in regard to the work done in that city show that it was the malaria work that first stimulated the idea of having an efficient health department for that city. If we have a chance in one town to establish a

health department and in the other town we have no hope of doing that, we should choose the town in which we can probably establish a permanent health department.

The next item is that of per capita cost. It is a phrase that I do not like, because I do not think you can measure in dollars and cents the accomplishment of any health department. We have to use some sort of measuring yard and we use a dollar for that purpose, but it is an extremely poor measuring stick. I have some figures here that we took last year about the little town of Bamberg and how much it cost to do the work. The cost of doing the work in that town, which has a population of 1900 or 2000, was $29,000. That seems a very large cost. There were certain deductions that could be made from that total cost. For instance, there is reclaimed land for agricultural purposes that can be valued easily at $10,000. That would reduce the cost to $19,000 and the per capita to $9. That is a great deal of money, but the economic loss in that town was $25,000 and the per capita was $16. Hence, was it not worth while to spend $9 to save $16? If there had been very little malaria and the economic loss had been $7 or $8, I doubt that it would be worth while to spend $9 to do the work.

That brings us back to the first principle. We must find out how much malaria there is, because upon that depends the economic loss to that town. The next is that the work shall strengthen the general health program of the state board of health. The work must be done to strengthen their hold upon the state and make the people turn to them when they need advice in matters pertaining to health. If it is stressed among those doing malaria work that is part of a great campaign, that it is being carried out for the betterment of health conditions in any county, city or town, you will accomplish a great deal. However, if you go down there and say, "This malaria work is extremely efficient and when it is done you won't have any more malaria," and yet the town has typhoid fever more than usual or has some other disease more than usual, your efforts to relieve them of malaria won't be appreciated. In all your conversations with the people it should be your duty to let them know that malaria control is only a part of the great health work which is being carried on in the United States, and to strengthen in the public mind their respect for your entire health department.

DISCUSSION

Dr. L. D. Fricks, U. S. Public Health Service, Memphis, Tenn.—The men in the field, the engineers who are in charge of these demonstrations, should not lose sight of the fact that we did not expect when we undertook this cooperative program, with the small but efficient force at hand, that we would accomplish malaria control throughout the South, but simply that we would begin a cooperative program with the expectation, of course, of making successful demonstrations. More than that, we began with a determination to strengthen the state health departments through this work and thus enable them better to carry on their programs for health protection within their respective states.

We have continued to work under the cooperative agreement for more than two years, and we can see at the present time approximately where we are getting, and where our efforts should be most strenuously exerted. While we have a few mistakes, it would have been impossible to expect that this agreement would apply to every state entering into it with equal force and in exactly the same way. I think we are to be congratulated in the selection of our towns for malaria control demonstrations and in carrying these on so successfully. We have been able to stimulate malaria control in most of the Southern states. Unfortunately some of the states, apparently, are not yet ripe for the program. Others, perhaps, have gone a little bit ahead of it. But I think we can all say at the present time that we have been engaged in an enormous work, and that we have been successful in doing what we had in view in the beginning, that is stimulating state health organizations and supporting and helping them to find a way for the development of malaria control within their respective states. When this has been accomplished, then I feel that the cooperative agencies should withdraw and allow the states themselves to carry on their programs. However, I do not think that this withdrawal should be premature, but that help will continue where needed and that we must at all times keep our eyes open for the best avenues of development for our malaria control work.

Mr. W. G. Stromquist, Sanitary Engineer, City Board of Health, Memphis, Tenn.—Apropos of Dr. Hayne's statement about towns that will not continue the work for more than one season, we should not feel too discouraged if some drop it after the first year. One of the Tennessee towns included in the cooperative program of 1920 did not carry on the work in 1921, mainly because of the financial conditions. Mr. Fuchs was there

a few weeks ago and they assured him that nothing could prevent them from resuming the malaria control work as they had more mosquitoes and more malaria this year than they had had for years.

Another Tennessee town which started the malaria control work in 1920 has employed a full-time sanitary inspector to work under the direction of the city board of health and have charge of the mosquito work during the summer in addition to other sanitary work. This is an instance of what Dr. Hayne mentioned, namely, that malaria control work is often instrumental in creating public sentiment in favor of public health work.

Mr. J. A. LePrince, Senior Sanitary Engineer, U. S. Public Health Service, Memphis, Tenn.—I am very glad to notice in all the exhibits that have come in, and in every chart that I have seen since our last conference, an excellent improvement upon what was going on previously. I have noticed also that in several states certain towns that have come in too late have decided that they were going to do the work anyhow whether they were going to get state help or whether they were not going to receive help. There is food for thought in that. If we can get the towns, get more towns into the frame of mind that they are going to do the work anyhow, get them to want it as much as that—and I think we can get them to appreciate it as much as that—it is going to be well worth while.

If, at the same time, we can let them understand what it is we will do, and what it is that we will not do, and then get them to desire to carry out what we want them to do, we shall have fairly easy sailing. But I do believe that it is necessary to begin right now, within the next few months, for the 1922 work. We are not going to get towns and town officials and the general public in that frame of mind rapidly. It is a slow growth, but if it is a sure growth that will grow steadily, that is what we want.

Mr. C. H. Kibby, Birmingham, Ala.—Dr. Hayne said that as one of the preliminary steps in deciding upon the town it would be best to go to the medical society and get their hearty backing. I am curious to know how he goes about it.

Dr. Hayne (closing).—In answer to the question as to how we get the physicians to cooperate, we do that in the same way by the same psychology that we employ to get any other body of men to cooperate: we tickle their vanity. We go to them and say to them that unless they cooperate with us the thing will be an absolute failure, and that by their cooperation it can be made a success; and we appeal to the pride that they have in their town and say that the increased efficiency of the citizenship of that town will make them more capable of paying the bills that the doctors will present to them.

FISH AS AN ANTI-MOSQUITO AGENCY*

BY J. A. LEPRINCE,
Senior Sanitary Engineer, U. S. Public Health Service,
Memphis, Tenn.

Mosquito control by means of fish has been known of generally for many years, but its practical application has recently been extended. Experience indicates that it was never intended that one species of living creatures should completely eradicate another, but rather to prevent it from becoming too numerous. Just as Nature provides certain species of fish to prevent excessive production of certain species of mosquitoes, so also is provision made in Nature to place certain barriers between the mosquito-eating fish and the mosquito larvae to provide for their continuation. The determination of economical means of removing these barriers is of intense interest to the sanitarian, and there is yet much to be learned.

In the malaria belt of our country, where malaria-conveying anopheles are most numerous, top-feeding minnows, which appear to prefer the larvae of anopheles to other forms of food, are not only abundant, but fortunately frequent waters in which the larvae of the malaria-bearing mosquitoes are found. It is our present impression that most of our malaria in the United States is conveyed by Anopheles quadrimaculatus. We find that our most useful mosquito-destroying fish (Gambusia affinis) of this country appear to propagate best in those bodies of water particularly suited to the development of Anopheles quadrimaculatus. In fact, Mr. Samuel F. Hildebrand, who has had more opportunity to study this subject carefully than any of the rest of us, states that the little Gambusia affinis is, generally speaking, limited geographically to our malaria belt.

From time to time our public press becomes interested in gold fish, and such wild suggestions have been made as stocking natural waters of large areas with

*Read in Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

gold fish. These suggestions, if carried out, would result in failure and discourage action along really effective lines. There is no question about fish being a useful anti-mosquito agency. What sanitarians should be most interested in is to determine which of all the mosquito-destroying fish will prove most effective in the mosquito control problems in the waters in which they desire practical mosquito elimination.

Regarding the efficiency of gold fish, several observations have already been reported where gold fish and anopheles larvae (in all stages of development) were found living happily together in large concrete tanks with vertical side walls and no floatage or vegetation on or below the water surface. In one of these cases the fountain tank was close to an expensive residence and the lady of the house was in bed as a malaria patient. Gold fish eat mosquito larvae, but cannot always be depended upon to eat or eliminate them so thoroughly as do other species of fish.

From Maryland southward, the Gambusia affinis appears to be the best fish we have for anopheles control and mosquito control. In several reported instances, it has been noted that this fish controls the anopheles production more thoroughly than that of some other species of mosquitoes. It appears as though this particular top-feeding minnow prefers to feed upon the larvae that remain at, or move about upon, the surface of the water. As a negro boy once said, "Boss, the top-minnows eats the high top floaters."

Any experienced field director of malaria control will tell you that gambusia are excellent agents for mosquito control. But those of us engaged in mosquito control in extensive areas do not understand that to mean that this fish will give desired results under all natural conditions. We understand them to mean that these fish are doing the very best that Nature is allowing them to do; that Nature often arranges so as temporarily or permanently to prevent the fish from completely eliminating the mosquito, unless this twenty-four-hour-per-day unsalaried-mosquito-inspector has some proper cooperation from the health officer and his assistants. With fish control we get something for next to nothing. We do not get 100 per cent desired results for nothing. Nature knows better than to do that. The health officer must help the fish help themselves. He must be on the *qui vive* for the sudden appearance of Nature's barriers between the fish and anopheles larvae, and also determine the most economical means for their removal or destruction. By removing one barrier, you may unconsciously be creating a substitute. You must be certain the barrier is completely removed and that it is not only supposed or reported to be removed. As the Irishman said, "Your own eyes are much better than those of others whether they are as good or not."

Artificial fish control of anopheles propagation may and probably will be extensively used within the next few years in the territory included in the malaria belt of our country. There are certain conditions under which fish control is not applicable. To go into a full discussion of that would take several hours. Also, I am not here to tell you all about fish control. There is much yet to be investigated. Those of you who are really interested in the relation of fish control to malaria elimination and intend to use fish control methods, should study the publications by Mr. Samuel F. Hildebrand, who is with us today, and by all means read the interesting report of the excellent fish control demonstration campaign conducted by Dr. H. H. Howard in Hinds County, Mississippi, and published in the SOUTHERN MEDICAL JOURNAL, Vol. 13, No. 4, April, 1920, page 260.

If you have malaria-control problems where you are not sure whether fish control would be applicable or not, a letter to the state health officer will bring such assistance and advice as you require for your problem. You need not be afraid of a thin or intermittent oil film killing gambusia.

You may be interested to know that Mr. Leopolda Villegas, Mayor of Laredo, Tex., has had gambusia placed in every well, cistern, water barrel and other sizeable water container in town; and that in Brownsville, Tex., the Woman's Club, the

Boy Scouts and the City Manager, Mr. Groupe, are doing similar control work. In these cases, it is a question of elimination of Aedes argentus, the yellow fever mosquito. The work is done primarily to make it impossible for any yellow fever case imported from Mexico to cause secondary local cases and incidentally to control the mosquito pest nuisance.

Last autumn these little fish were properly distributed in the water containers throughout the towns of Tampico and Tuxpan, on the coastal plains of Mexico, by direction of the Mexican Federal Health Service, and they drove yellow fever from these towns. During the present summer yellow fever remained absent in those large towns, although cases occurred in near-by villages. The Mexican health authorities are to be congratulated upon the rapid and economical results obtained under difficult conditions. We found Mexican inspectors at Laredo could inspect house yards of twenty blocks per man per day. I have personally accompanied Mexican inspectors at Laredo, Tex., and have seen them inspect 263 house yards per day, record their findings intelligently, and repeat the operation on succeeding days with the thermometer above 90° in the shade at noon.

It is our duty in coming to such a conference as this to act as distributors of useful information that will lead to an increase of applied practical sanitation. The discussion of this subject will be of more practical use to you than that which is now being read.

The following suggestions are offered:

(1) The value of gambusia to the people of the South should be very much more commonly known than it is today. It is the duty of the health officer and the sanitarian to see that they realize it. If you are ready to do your share, the editors of the public press in your section are ready to assist you right now.

(2) Each county health officer in the malaria belt should make it his business to see that a fish hatchery is established at the county seat, where those who come into town on Saturday afternoons can and will notice it. In some towns a concrete tank can be placed in the court house square, gambusia should be installed, and the attention of the public invited to the fact by an appropriate sign. Also, owners of permanent stock ponds generally allow us to use their property as hatcheries.

(3) In Tampico, Mexico, Dr. A. Cuaron, representing the Mexican Federal Health Service, surrounded each of the large concrete fountain basins in the public plaza, where the crowds gather, with a four-foot high picket fence, painted in the national colors, red, green and white, and kept the tanks empty and everybody guessing what it was all about. Later he turned on the water, stocked the tanks heavily with gambusia and had appropriate signs attached telling the public that these fish would drive yellow fever out of the city if the public would ask for them and use them in cisterns and all other water containers to prevent mosquito production. The public response was all that could be expected. The plan was a huge success.

(4) In many counties there are permanent ponds near well-traveled good roads. These ponds can be stocked easily, at small expense, and large signs used to tell the rural public that the county health officer can supply them with gambusia. In many cases the women's clubs, or chambers of commerce, etc., can and will gladly help to finance the making and installing of this large advertising sign.

(5) The wise county health officer is aware that the public is of the opinion that "seeing is believing," and knows that the public can both see and feel the effect of the absence of the mosquito pest and of the usual seasonal malaria. If correctly planned, mosquito control measures can be made to be a lever for other classes of rural sanitation that are not yet so readily measured by the public eye. Some of our progressive county health officers are applying this idea with excellent visible results.

(6) The county superintendents of schools can be interested and jars of fish kept in each school. Final school examination papers can contain a question or two about gambusia. There should be properly labeled exhibits of gambusia at every county agricultural fair. This ex-

hibit could be used to induce farmers to breed this fish in their stock ponds.

(7) Many stock ponds in impervious soils go dry in the summertime. A health officer can often, by proper suggestion, get the farmer to deepen the pond at one point sufficiently to retain some water throughout the period of drouth. This will keep the fish alive, provide water for stock and help to prevent malaria transmission. It can be done in the season of the year when other work is not pressing. A drag scraper and one or two mules could do this work in a short time and give permanent beneficial results.

(8) The Gambusia affinis is present and waiting to help the health officer, waiting to work 12 to 24 hours a day for him throughout the entire mosquito season without pay. The important question is, Are the health officers ready, or are they only waiting? Will they give the gambusia the little assistance necessary to overcome the barriers placed by Nature in front of this small fish of big sanitary importance?

Discussion follows paper of Mr. Johnson, page 376.

EFFICIENT AND ECONOMICAL USE OF OIL IN THE PREVENTION OF MALARIA*

By E. B. Johnson,
Assistant Sanitary Engineer, Alabama State Board of Health,
Montgomery, Ala.

Ever since the inception of malaria control work, oiling has occupied a prominent place in such work, and probably, in the minds of the public and of many physicians and other people interested in health work, it is regarded as the most important factor in malaria control. The fact that oil regularly applied to standing water will prevent the anopheles mosquito, the sole means of the conveyance of malaria from person to person, from reproducing, has made a profound impression upon the public mind far out of proportion to its real importance.

To accept oiling as the panacea of all mosquito ills, a thing which the general public and all too many health workers have done, is to overlook far more important methods, and methods which should by all means have precedence over oiling. No amount of oiling can ever take the place of adequate drainage and filling. The most fundamental principle of malaria control work should be drainage and filling of all anopheles breeding places wherever economically feasible.

We have come to believe that in general permanent ponds, pools, cisterns, wells and the like in which anopheles may breed can be controlled much better by other means than by oiling. Oiling is dependent upon human nature, which is far from infallible. In the common top-minnow, or gambusia, we have a destructor of mosquito larvae and pupae which does not depend upon human nature, which works three hundred and sixty-five days a year, and which never takes a vacation or goes on a strike. Why depend upon oiling when we have this far better means of control which can be used in such places as those mentioned? Use gambusia instead, for they have given the desired results more economically and more effectively in almost all places where tried out.

In other places we have found that oiling does not work at all. In polluted water, oftentimes in that which is so slightly polluted that anopheles will not breed in it (and it should be understood that anopheles will not breed in heavily polluted water), oil sometimes will not film. When we consider that the action of the oil is to form a film over the surface of the water, through which the anopheles larvae and pupae cannot breathe, it is easy to see that using oil on polluted water where it will not film is a fine way to waste oil, but a very inefficient and uneconomical way to use it. Such places can be controlled by applying "Kreso Dip No. 1" with a hand mist-spray pump.

When the necessity for using oil in such places has been eliminated, a long step has been taken in the efficient and economical use of oil, but there is still left a wide field in which, so far as our present knowledge goes, oiling is supreme. In wa-

*Read in Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

ter barrels where anopheles sometimes breed, in semi-permanent ponds (those which may last long enough after a rain to produce anopheles, but not long enough to justify the use of gambusia), in the innumerable pools, puddles and marshes which accompany a rainy spell during the breeding season, in ditches where the current is not swift enough to prevent anopheles breeding, we know of nothing which will take the place of oiling. In anopheles control work it will be found that this class of work which must at present be taken care of by oiling will cause by far the greater proportion of the continuous expense, will give by far the most trouble, and will give the public by far the best opportunity to offer the objection that the work is being inefficiently and uneconomically done. It is, therefore, of the greatest importance to do this class of work with the utmost efficiency and economy possible.

For the first, or water barrel class, a mixture of half crude oil and half kerosene should be used. Waste oil from garages — that drained from the crank cases of automobiles — can also be used, but in this particular class it will be more effective if strained and mixed with an equal volume of kerosene. The use of the "mosquito oils" now being so highly recommended by several companies should be avoided, if possible, as many of these have proved to be very unreliable and ineffective. The use of black oil in the place of crude oil should also be avoided, as black oil is very inferior and will almost always fail to do the work expected of it. It is best to put a thick coating of oil directly on the surface of the water in the barrel, some advocating the use of as much as a pint to a barrel: such an amount of oil holds a film sufficient to prevent anopheles production for several weeks, whereas a thin film requires renewal once a week and almost invariably some barrels are missed in the renewing and become breeding places.

In all other places a mixture of equal parts of crude oil and kerosene will give the best results. The proportion should not be changed unless experimental trial shows that in the particular locality in question and at the particular time in question another proportion works better. Even in cases where this is true, it should be borne in mind that at another season of the year the fifty-fifty mixture may become more efficient. Waste oil from garages, mentioned above, may be substituted for this mixture with success. Oil used on this class of work should be applied once a week and as near as possible on the same day of each week, thus making sure that there is an unbroken film of oil on the water at least once every seven days. If this is not done, a sufficient time may elapse between films to allow the production of a crop of anopheles.

The application of oil in all this work is best accomplished by thoroughly mixing the oil with sawdust and applying it in the manner described below. Sawdust used for this purpose must not be green, must not be hardwood sawdust, and must be dry. Enough sawdust should be used so that the mixture is not wet to the touch, is of a brownish or leaden hue rather than black, and so that the particles will separate cleanly when a handful is thrown on the water: if the particles clump together on such a test, more sawdust is needed. The amount of sawdust used will be surprising: several times as much sawdust as oil will be necessary.

This sawdust and oil mixture should be allowed to stand for twenty-four hours to allow the oil to soak well into the pores of the sawdust, and is then ready for use. In oiling ponds, pools, and puddles, the sawdust should be scattered or sowed on the surface, as one would sow wheat or oats. Particular attention should be paid to the edges and to vegetation in the pond, as these places are where the anopheles larvae and pupae are most liable to be. Enough sawdust should be used so that there is an unbroken film of oil upon the surface, especially in the places noted.

Ditches, with the exception of seepage ditches, where the flow is small and slow, should be oiled by sowing several handfuls of the sawdust on the water at the head of the ditch and then repeating where the film thus formed becomes inadequate: this distance must be determined by trial and will vary greatly in different ditches and under different con-

ditions of flow and of cleanliness of flow line. It may in some instances be as great as a quarter of a mile or even more, and under other conditions not over a few hundred feet.

Seepage ditches should be oiled by soaking a ball of common waste about the size of a baseball in the same mixture of oils for the same time, and then pinning it to the bottom at the head of the ditch with a peg or twig so that the whole is entirely below the surface of the water. One hundred feet below this a boom should be placed entirely across the ditch with edges two inches below and two inches above the flow line. Just below this boom another ball of waste should be secured in the same way as the first, and this procedure repeated throughout the length of the ditch.

In oiling semi-permanent ponds, a three-quart flour or sugar sack may be filled with oil-soaked waste and sawdust, allowed to soak in the same mixture of oils for twenty-four hours, and then moored in the pond by a rock and rope long enough to allow the bag always to float, but not long enough to allow the bag even to touch the sides of the pond. Such a sack will give off at once a film sufficient to kill all anopheles larvae and pupae present and will then maintain for a long time a film sufficient to prevent anopheles from laying their eggs on the water. In two ponds oiled by this method in Montgomery, Ala., anopheles breeding had not been resumed eleven weeks after the sack was moored. The big advantage of this method lies in the fact that less oil is used, the labor cost is reduced, and the human equation is eliminated for a considerable length of time.

In oiling places it is difficult to reach with sawdust, as under low buildings, the same mixture of oils, or waste oil from garages strained and mixed with an equal volume of kerosene, may be applied with a knapsack spray can. For general use, however, the knapsack spray can is heavy, unwieldy, wastes oil badly, and is all too often used in a ridiculous manner by laborers; and the use of it should be reduced to the smallest amount possible.

An adequate inspection service is an absolute essential in efficient and economical oiling. Oiling is very unsatisfactory at best. Certain experiments now under way give promise of revealing a method of control which can be used in the place of oiling and which will be far better than oiling. However, until the experiments have been concluded and the method proved good in actual practice, it cannot be accepted as a universal substitute for oiling. In the meantime we must trust to oiling, and if the oiling is to do what is expected of it, an adequate inspection service must be maintained.

The first step in good oiling is to confine the oiling needed to the smallest amount possible by the use of drainage, filling, fish and the use of other larvicides in places where oil will not do the work. What oiling is then necessary should be done in accordance with the methods outlined above; and an adequate and efficient inspection service should be maintained to make sure that the oiling is really doing the work which is required of it. The oiling will then be about as efficient and economical as we know at present how to make it.

DISCUSSION

Papers of Mr. J. A. LePrince and Mr. E. B. Johnson.

Mr. Samuel F. Hildebrand, U. S. Bureau of Fisheries, Washington, D. C.—Mention has been made of the research still required and of our limited knowledge of the use of fish; and that, of course, is very true. However, I feel that we are making wonderful progress. A year ago last spring I was assigned the pleasant task of visiting the various health officers in the South. I went from state to state, first calling upon the state health officers, and thereafter I went wherever they directed me to go. At that time there were very few health officers who were using fish. They all had heard of fish and their application in anti-malaria work, but they had not reached the point where they really felt that it was a practical thing. Only six months later, when we had a conference at Louisville, Ky., and even before that, we were receiving encouraging reports. This year the work has spread until I am beginning to fear that the pendulum has swung too far and that there is danger of leaving too much work for the fish to do.

I carried on some investigations this summer for the purpose of acquiring more information relative to the true value of fish as agents for the control of mosquito production. The details of this work have been given before another section of this meeting. From these studies it appears that even under very unfavorable conditions we can expect approximately 90 per cent decrease in mosquito production by the use of

gambusia, and when there are no barriers in the way we often get complete control. The thing we must work on most is to recognize the obstacles or barriers to which Mr. LePrince has referred, and then we must learn how to eliminate them.

Mr. LePrince is of the opinion, and I have seen this in print and heard it stated by others, that gambusia is more efficient in destroying the anopheline than the culecine larvae and pupae. The data which I have collected, if they show anything, show that the reverse is true.

Mr. LePrince also referred to the necessity of the removal of vegetation, which is a very important matter. He stated that it must be known to have been removed, not only reported to have been removed. What he meant to say was that such work, if undertaken, must be thoroughly done. I have given before another section of this meeting the result of my experiments in removing vegetation from ponds.

I shall not repeat the details here, but I may say that I found that by partly removing certain types of vegetation and not doing it thoroughly we increased mosquito production about ten times. That is to say, if we had not removed the vegetation in part we would have had very much better control. The reason for this is that the vegetation, if it is dense, very frequently will grow up above the surface of the water, leaving only the slender stems to penetrate the surface of the water, and which furnish little or no protection, whereas vegetation which is scant or which is just growing up has many leaves at the surface and the leaves, when partly or slightly submerged, form the barrier. If, then, the removal of vegetation is undertaken, it must be thoroughly and completely removed.

The suggestions for educational work constitute the most important part of the paper which we have just heard. I wish to give you a few examples of the questions that have been asked me at various times which show the need for education. I am very frequently asked, in speaking of minnows in relation to mosquito control, "How do they catch the mosquitoes; do they jump out of the water for them?" I explain that the fish do not do that, but that they eat the larvae or the wiggle tails of the mosquito which live in the water. That is more news! People have known the mosquito and the wiggle tail all of their lives, but they have not connected the two. These questions do not come from the uneducated alone. They have been asked by business men and by professional people. A lawyer who is a graduate of one of our prominent universities, who has had several years' experience as a lawyer, and has had malaria himself—and you know that a lawyer is supposed to be versed on all subjects—admitted that he had never associated the wiggle tail with the mosquito. A doctor of twenty years' experience as a physician was arguing with me the other day and became greatly disgusted because I insisted that the tadpole and the wiggle tail were not one and the same thing.

Then we have those people who insist and maintain that mosquitoes breed in weeds. I say, "No, they cannot breed in weeds unless there is standing water beneath them." They say, "Yes," for have they not seen the mosquitoes come from the weeds and trees? Just the other day, a bank president made this same statement, and again I stated that it was impossible, for the mosquito must have water to reproduce its kind. The gentleman turned his back on me in utter disgust.

Only recently a Colonel in the Medical Corps of the United States Army asked me from what the wiggle tail originated. I told him that it originated from the egg laid by the mosquito. He said of course he knew that it originated from an egg somewhere, but he did not know whether or not there were any intermediate stages.

Last spring I was in the office of one of our state health officers when a news reporter came in and asked the health officer for news. The doctor dictated the following statement: "Mr. Hildebrand, of the United States Bureau of Fisheries, is here consulting with the State Health Officer and the sanitary engineers as to the best method of controlling malaria by the use of fish." That statement was quoted verbatim, but here is the headline which was supplied by the paper, "Eat More Fish. Best Way to Control Malaria."

I have given the few foregoing examples merely to show the need for education, hoping thereby to emphasize the timely suggestions offered by the Senior Sanitary Engineer.

Dr. T. H. D. Griffitts, U. S. Public Health Service, Norfolk, Va.—I have been conservative in the use of fish in malaria control. I have had occasion to know that they have done wonderful work in certain parts of the country and under certain conditions anywhere from Texas to the northern boundary of Virginia. But when I can come now and hear Mr. Hildebrand say that the pendulum has probably swung too far the other way, and listen to Mr. LePrince stress so strongly the importance of removing "barriers" against the action of top-minnows, I feel like limiting very much my discussion of the paper.

Now, relative to newspaper articles in advertising these little minnows, I saw a squib recently—an editorial squib—in which it was said that fish were to be raised in this country and sent to Spain for the purpose of controlling mosquitoes. The editor said: "That reminds me of purchasing a 'hair tonic' from a bald-headed barber."

To my mind the most important use to which we can put top-feeding minnows is their introduction into newly made ponds. There is no subject that has struck at the heart of the welfare of the South so much as the impounding of water for hydro-electric power purposes, both from the industrial development standpoint and the health standpoint. Wherever water is impounded in Southern states, arrangements should be made before the water is impounded for stocking that pond immediately or just before the dam is closed. There should be a sufficient number of hatcheries of sufficient size to have plenty of top-feeding minnows to be placed in these waters from the start just as soon as possible.

It so happens that in these impounded water projects—some of them at least—gambusia may

perhaps not have been prevalent there before. Their introduction should be looked after in the large reservoirs and in the smaller ponds throughout the country.

Another point is that in certain sections of the country this year there has been an unprecedented drouth. In North Carolina and Virginia, especially, it has been very dry. Swamps that have been wet for twenty-five years have dried up, and it seems to me there is a possibility of increase of malaria in a normal season or wet season following such a dry season, if the top-feeding minnow and other natural enemies of the mosquito are killed out in those swamps. I think following a dry season we should especially look after the re-establishment of the top-feeding minnows in these swamps and ponds. That would apply especially in connection with rural malaria control.

One other point is the longevity of top-feeding minnows in artificial containers or artificial places where they have been transported from their natural habitat. In June, 1917, I placed ten male and ten female gambusia in an old brick-walled tank about twenty feet wide. The water was very foul and the place was filled up with bricks and chunks of wood, old tin cans and general rubbish. The water was so foul that I had no idea they would live in there a month. A month ago I found about five hundred there. That makes four years and five months. So I find it is safe to conclude that they will live under rather adverse conditions for a rather long period.

Mr. W. H. W. Komp, U. S. Public Health Service, Camilla, Ga.—Influenced by the ecclesiastical atmosphere, this has become an experience meeting, and I want to give testimony as to my conversion to a faith in oil. A new method of anopheles control has been evolved, which makes the use of oil for this purpose a back number. I had the pleasure this fall of being associated with Dr. M. A. Barber, of the U. S. Public Health Service, who is in the audience, and can tell you more about the new method than I can. I have had practical experience in the use of oil as an anti-malaria measure, and I want to make it clear right now that there is a difference between the use of oil as an anti-malaria measure and as a mosquito prevention measure. The two are entirely separate things. The new method is not applicable to culex control, which is its chief disadvantage.

The method Dr. Barber has evolved is the use of Paris green or other arsenical for the destruction of anopheles larvae. Mr. Johnson has gone on record as saying that oil in no case will destroy 100 per cent. So far as we know, Paris green will not give 100 per cent control, but it did give 99.36 per cent control inside of twenty-four hours. It is effective wherever oil can be used. It is also very effective in places where oil cannot be used against anopheles larvae, especially in dense aquatic vegetation where fish can not penetrate and in stream breeding. Oil-soaked sawdust which has lost its oil forms itself a protection for the anopheles larvae, and therefore cannot be recommended. The arsenical dust method will be published in the *U. S. Public Health Reports* and will contain full report of the method. The arsenical dust acts as a stomach poison, exerting a selective action upon anopheles larvae because of their surface-feeding habit.

In regard to the difference in cost of the two methods I can give you some data. Ten cubic centimeters of Paris green are mixed with two quarts of ordinary road dust. That mixture is sufficient to treat one thousand square feet of water surface. The method of application is simply to sow that dust containing the Paris green over the surface, standing to the windward side so the dust will go all over the surface of the water in the same way that a dust cloud settles on the landscape after an automobile passes on a dusty road.

As to the cost of oil, the usual method is the use of the spray can, using something like one ounce to every fifteen square feet of water surface. Oil costs between 10, 15 and 20 cents a gallon. You can figure the mathematics yourself. On the other hand, Paris green used in this proportion over a thousand square feet costs exactly seven-tenths of a cent at ordinary prices.

Regarding the use of oil in artificial containers, Dr. Barrow, Chief Surgeon of the Central of Georgia Railroad, has reported the use of ordinary lime as a most efficient substitute in rain barrels. He says that one-half pound of ordinary lime placed in a rain barrel will be effective all season. That has not been tried so far as I know except on the Central of Georgia Railroad; but Dr. Barrow has given that particular method prominence, and I am sure it would be worth a trial.

Dr. H. R. Carter, U. S. Public Health Service, Washington, D. C.—Mr. Hildebrand spoke of leaving too much for the fish to do. What he means is that where the fish cannot get at the larvae you can not expect them to eat them. Where there are many fish, if they are hungry, they will go through an amount of growth and trash more than you would think. We must eliminate the protection of the larvae from the fish. As possibly some of you know, Mr. LePrince, Mr. Griffitts and I have worked together—the speaker since 1913, the others since 1914 or 1915—on the problem of the impounded water in the South and how it affects the incidence of malaria. We found its effect was usually very bad. The edges of the ordinary pond, and those you have heard spoken of in Georgia recently, you clean up with spades and shovels. Lake Bankhead, on the Black Warrior River in Alabama, has 235 miles of shore line. I do not think that one man would willingly undertake to clear that with a spade and shovel. The Coosa pond of Lock No. 12, in Alabama, has from seventy-five to a hundred miles. But even that it is impossible to do by hand.

In all these large collections of water the drift, which is heavy stuff, does not protect against the gambusia; but the floatage, which is very small stuff, about one-fourth the size of the head of a pin, is what protects the anopheles from the gambusia. In some places it will be so thick that it has lifted itself out of the water; and, of course, in dry places no larvae grow. In other places it is still soaking wet and the larvae

are on top of it in the film of water on the surface.

Fish are worth practically nothing in floatage. That is to say, they may destroy a million or so of larvae, but that is only a small proportion of the number that are there. In the Coosa pond in 1915 the company responsible for it was very much alarmed at the number of suits brought and wanted to do the best they could to prevent the criticism and the appearance of malaria. All who blamed them for the malaria adjacent to the pond said it was because of their lowering the pond and leaving the edge exposed to the sun. They, therefore, at considerable expense, put in a telephone line some one hundred or two hundred miles up the river; put in a steam plant so as to supplement their power and keep the pond at a constant level. Whenever a flood would come they opened up the wier and let the water pass out of it. Whenever they did not have water enough for power without lowering the pond too much, they started the steam plant. In other words, they went to an expense of many thousands of dollars and tripled the amount of anopheles that would otherwise have been produced. Well meaning but unwise was their practice.

The Parr Shoal pond in South Carolina in the same way was kept at a constant level by the United States engineers and was one of the worst breeding ponds I ever saw in my life.

What we recommend is to keep the water as high as possible during the non-breeding season—roughly, from October 1 or 15 until June 1 or 15 of the following year—and then lower it as much as could be economically afforded for the summer. Keeping the pond up, say three feet above the summer level, would kill all land grass, all land vegetation up to the level of the water. Lowering it in the summer gives it almost a perfectly clean bank. For the second year I think I can leave out the "almost." Naturally the drift, the floatage, and everything accumulating in the winter will land upon the bank and leave the water edge practically bare so that the fish can find the mosquitoes.

In addition, we asked that they would save every rise that came down. Instead of losing the water, which is worth much to the power company, they keep that dam closed and save the rise, and raise it two or three inches or a foot or two as they can, and then lower it again afterward. Whenever you make a mosquito move, the fish has a chance at him, whether from lowering the pond level or raising of the level. Also, when the freshet comes their floatage comes down. It will go to the bank and if that level is two or three feet above summer normal, then when the level is lowered again it will be left upon the bank stranded above water level.

This is the first time I have had an opportunity to see the effects of that work. At Badin, in North Carolina, which both Mr. Hildebrand and Dr. Griffitts will agree, was at one time a bad pond when breeding anopheles, we had extremely good results. It is the American Aluminum Company's pond, and aluminum was selling very low. The manager asked what he could do to lessen malaria. We told him he did not need so much water this year; to lower his pond thirty inches; and he said he would do that. I went there in August, and, in fact, stayed there from August 1 to August 20. I went over that pond with two assistants and found practically no anopheles larvae on the banks of the pond. The banks at the water's edge were clean and the gambusia had absolutely attended to the rest. Too much had not been left to them. I may say in addition that the manager there had planted a large number of gambusia, had two gambusia hatcheries, and practically every day in summer carried from five hundred to a thousand to the creeks in his pond. It is a well managed pond from a sanitary standpoint.

At the pond of the Southern Power Company, in South Carolina, the history is that there was a great deal of malaria there in 1920. I do not know about that. We saw the pond this year and it was ten feet below the summer average. I got there August 24 and every one knows that is the season when you expect anopheles to breed. Mr. Fisher, Mr. Boldridge and I worked on that pond roughly for two and a half weeks. We were able to hatch out three anopheles from the larvae we took.

That is the method to clean the banks of large ponds, to remove the protection of the larvae against the fish. I simply give that to emphasize Mr. Hildebrand's statement not to leave too much for your fish to do. By lowering the level of your pond, you have the water edge against a clean bank better than by two or three millions of dollars spent in hand cleaning, and this method costs nothing.

One thing that Dr. Griffitts said was noted: the death of fish in dry seasons. Mr. Fisher and I did some work in Bamberg, S. C., in 1919. It was exceedingly dry, and the health officer of the place—I think it was the mayor, not the health officer—took pains to cover heavily with oil every little pool, and there were not many of them in which any fish were left with life. I think it was perfectly certain that there was not a mosquito-eating fish left in Bamburg after the summer of 1919. Oil can do harm as well as good.

Mr. George Parker, Sanitary Engineer, Jacksonville, Tex.—There are two points which Mr. LePrince brought out in his paper that should be emphasized. One is the possibility of economical malaria control by the use of fish, a method available to all. We have the Gambusia affinis that perform their work without instructions, and as Dr. Carter, Mr. Hildebrand and Dr. Griffitts brought out, they need only the aid of the health officer or field director or whoever may be conducting the control work.

The second point is with regard to the Anopheles quadrimaculatus. We believe in general that this species of mosquito is principally responsible for the transmission of malaria in this country. We know that this mosquito, in its aquatic stages, will be found in still water, ponds and places of like nature. Such places are also the selected areas in which the gambusia lives. Therefore, we have a strong connecting link between the two which gives the fish the advantage. During the breeding months anopheles are generally found in such places, but not frequently are the fish found. So the body of

water must be stocked and the fish will thrive to the detriment of the mosquito larvae.

In one of the Texas towns that has carried on malaria control work for the past two years, statistics have shown that 75 per cent of the malaria cases among the town people were being contracted outside the control area. It was found, as a rule, that such cases were contracted while the person was on a fishing trip or some venture that exposed him to infected mosquitoes. The City Council of this town, Jacksonville, Tex., viewed the situation from two angles: first, that the citizens were going to continue to visit such areas and contract malaria; and, second, that the people who lived in these areas were directly connected with the town in a commercial way, that the town was their point of market distribution for their crops, etc., and that the personal welfare of these people directly affected the welfare of the town. It was decided to stock every known body of water within the surrounding one hundred square miles of the town with gambusia. The project was advertised in the local papers and the farmers requested to notify the health officer if there was water standing on their places. The cost of doing this work was about $25.00.

In one of the counties of east Texas, a malaria survey is being carried forward at the present time with funds provided by the county Red Cross chapter. The purpose of the survey is principally educational, and the determining of the malaria rate by blood examination. There are seventy-one school districts in the county and to them this work is being extended. As one of the features of the survey gambusia hatcheries are being advocated. Each school district is being requested to establish and maintain such a hatchery, which is to be under the direct supervision of the school children. Very often the day after the recommendation has been made we have received word that the pond was ready and to provide the fish. By doing this there will eventually be seventy-one gambusia hatcheries in that county, covering an area of 1049 square miles and populated by 37,000 persons. As the gambusia are distributed by the school children and multiplication takes place, there will undoubtedly be a marked reduction in malarial fever throughout the entire county. The cost will be practically nothing and will be governed only by the cost of shipping the fish from the main hatcheries which the larger towns are supporting for their own control work.

Mr. LePrince (closing).—I think you will get the very best possible answer by following the suggestion I made of reading one or two bulletins that I referred to which you ought to read anyhow, written by Mr. Hildebrand. I am not going to answer your question, so as to make you read them.

I have mentioned the fact that all was not known that ought to be known about fish control, and I find out I was right. Many very good points have been brought out.

It is probable that I am wrong in regard to the gambusia preferring anopheles to culex. But there are exceptions to all rules and I have run into 100 per cent exceptions. It may be in one state that they do not act the same as in the other.

The point brought out about the examination of birds' stomachs is rather interesting. We shot birds down on the Isthmus. In fact, we used it for proof as to mosquito flights. Before checking those flights we stained our mosquitoes and determined the field ranges. We thought we knew what we were doing. We did not at all. We carried this experiment out in the Southern states and then discovered a year or two ago what we were doing was to learn how to win the war. When the war came on we knew exactly how and where to operate, and the whole thing started from watching the birds.

But the thing can be overdone. I believe that the matter of the practical use of birds should be left to scientists to develop and for health officers to follow later. I am inclined to believe we have enough other insects than mosquitoes bothering the farmers, so the birds could be left for them. It is most unfortunate that the discussion which has been given here cannot get to more working sanitarians and county health officers all over the South. If funds cannot be provided for the printing of the proceedings, maybe some of you have some millionaire friends who would be delighted to become members of this Section and provide them. I do not think we ought to let such valuable information as this be kept away from the men who are out in the field today doing work for the benefit of humanity. It is a mistake.

Mr. Johnson (closing).—I think Mr. Komp has been very good to give us a description of the Paris green method. We must all agree that it is a most important method, because oiling is unsatisfactory. This method is in its place much more satisfactory and much less costly.

But there is one point which should be emphasized. In Alabama—and I believe it is the same generally in the South—there are many communities in which the people want to eliminate the pestiferous rather than the malaria species. You cannot get their support for eliminating the malaria mosquitoes unless you also control the other mosquitoes. The great trouble with the Paris green method is that it will get the anopheles and the anopheles only. It has no effect upon the more pestiferous species.

Until we can get the sentiment all over the South aroused to the fact that we can eliminate malaria by controlling anopheles and not bothering about other mosquitoes, we shall have to control those other mosquitoes. And until we find a better method for controlling them, we shall have to rely upon oiling.

MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

THE TOLERANCE OF CHILDREN FOR DIGITALIS*†

By Hugh McCulloch, M.D.,
and
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PURPOSE

During the past two years we have been administering digitalis to children with heart disease in an effort to determine, first, how much of a standardized preparation of digitalis is necessary to produce a physiological effect on the heart; second, how closely the clinical improvement in the patient coincides with the appearance of physiological effects on the heart; third and last, in what way do children differ from adults in their responses to digitalis. It is our purpose to state the opinion we have formed in seeking an answer to those questions and to call attention to certain observations noted.

INTRODUCTION

At the present time it is possible to administer digitalis to individuals in such a way as to produce within a reasonably short time an effect that will be of striking benefit to the patient who is suffering from heart disease. Very large doses may be administered using a preparation whose strength has been estimated by careful standardization according to the method of Hatcher and Brodie[1] and estimating the amount of the drug required for the particular individual by following the recommendation of Eggleston[2] and his associates. The administration of such maximum doses of digitalis has been carefully studied by Robinson[3] and others, and as a result of their work considerable light has been thrown on our knowledge concerning the clinical use and effects of digitalis.

It is commonly agreed that the use of a massive dose of digitalis is distinctly indicated for the relief of patients who are suffering from heart disease and who are in a state of more or less complete cardiac failure, or, as we more popularly describe it, who are decompensated. It is a matter of common observation that our most striking results are obtained in those individuals who have cardiac failure associated with fibrillation of the auricles, indeed, it has been stated by some workers that the only cases in whom we may expect striking results from digitalis are those who have such fibrillation of their auricles: that cases of heart failure suffering from other forms of heart disease show little, if any, improvement from the therapeutic use of digitalis. It has been held by these workers that the beneficial effects of digitalis on the heart come, not from its effect on the heart muscle proper, but from its effect on the vagus center in the medulla or directly on the conducting mechanism of the heart. The weaker of the too numerous auricular impulses are blocked from passage to the ventricles with a resulting slowing of the rate and physiological rest for the ventricular muscle.

But we have observed that auricular fibrillation is a very rare incident in the career of the usual cardiac child who has been under observation in the St. Louis Children's Hospital or in the Children's Cardiac Clinic of the Washington University Dispensary. Indeed, we have encountered not a single instance of auricular fibrillation in any child who has chronic heart disease. This led us to wonder if there is any justification for the therapeutic use of digitalis in children who do not have auricular fibrillation and, if it does seem justifiable and advisable to give digitalis as a therapeutic measure

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to these children with heart disease, in just what way may we proceed rationally to employ our drug? We have considered that the administration of digitalis to children who have heart disease without cardiac failure is not indicated at any time as a therapeutic measure, though such children often give a history of having received digitalis. We have been very much concerned, however, in regard to its use in children who have cardiac failure at the time of their admission to the hospital or who give a history of having suffered from cardiac failure as a complication of the infection in their hearts.

Previously[4], in an effort to determine an amount of digitalis necessary to produce some clinical effect, we have given digitalis to children who had hearts that were free from disease in so far as we could determine. Our observations on these children led us to think that as in adults, the response children show depends to a large extent on the manner of administration of the drug: that, associated with the age of the child, there is some variation in the amount necessary to produce an effect; that on the whole larger amounts are necessary to produce effects in those children with normal hearts than in adults who had heart disease; and that children in this group under similar circumstances showed a wide variation in the amount necessary to produce an effect.

METHOD

We have carried out our observations on the group of children with heart disease under conditions similar to those that existed for the children with normal hearts who received digitalis[4]. This has been adopted as the established method for administering digitalis to children in the Hospital. Tincture of digitalis purchased in the open market and standardized by us according to the method of Hatcher and Brodie has always been used. The drug has always been administered according to the body weight of the child, estimated according to the formula of Eggleston[2]. The total amount of the drug was given during a period of twelve hours; 50 per cent being given as an initial dose, 25 per cent four hours later and the remaining 25 per cent eight hours later. Control electro-cardiograms were made before any digitalis was given and subsequently at sufficient intervals to determine any effects that might have appeared. We have considered that the appearance of vomiting or alterations in the electro-cardiograms commonly attributed to the effect of digitalis on the heart gave us a fairly accurate idea of when we had given a sufficient amount of the drug and could be used as the end reaction, so to speak, of our observation.

GENERAL CONSIDERATION

It has been found entirely practical to use large doses of digitalis for administration to children, and this method of administration possesses for children all the advantages that it does for adults when compared with the alternative method of using smaller doses given for a long period of time. From our experience the method in itself possesses no source of danger that cannot be done away with by careful supervision and control. Certain contraindications will be referred to later. Certainly, if we consider that a child needs digitalis and that relief for his distress can be provided in no other way, then the best result obtained in the quickest time is the method of choice. If the drug is needed at all it is needed quickly and effectively. Smaller doses given at intervals of time over longer periods may be of value in keeping a heart under the influence of digitalis and this may be a desirable procedure when the occasion arises.

The total amount of the drug necessary to produce an effect on the heart can be estimated according to the method of Eggleston. It is necessary to know the body weight of the child and the strength of the preparation of digitalis, whether it be dried leaves, tincture or infusion. It is our custom to give 50 per cent of the estimated dose at midnight, 25 per cent at 4 a. m., and if no effects have appeared at 8 a. m., to give the remaining 25 per cent. This permits more convenient periods during the day to have the child under observation. Vomiting or electrocardiographic changes always occur during the day period of twelve hours. In such cases when it was necessary to give

more than the estimated dose—and this was frequently the case — it has been given at 12 noon and at 4 p. m.

The optimum therapeutic effects of digitalis might be considered to come from that amount which is sufficient to produce a beneficial effect on the heart and yet not enough to be deleterious to efficient cardiac action. But digitalis is not a food for the heart. It is a poisonous drug and its beneficial action may, if carried too far, become distinctly harmful. Fortunately, certain signs appear which let us know that the danger zone is being approached. We have observed that these children show either nausea and vomiting or a perceptible fall in heart rate, and we have come to consider that these phenomena indicate that a necessary amount has been taken into the blood and made available for the heart muscle tissue. They are routine bedside observations, easily made, and quite constantly precede the more profound effects of the drug on the cardiac mechanism, such as a delay in the auriculo-ventricular conduction time or the appearance of contractions from ectopic stimuli. We have considered that a drop in heart rate of at least ten beats per minute observed twice, two hours apart, or recorded as a constant rate in the electro-cardiogram is a perceptible fall in rate. The fall in heart rate or the appearance of nausea are signs that occur with improvement in the cardiac action and general circulation and subsequent observations show that those children who have received this amount of the drug have approximately an optimum therapeutic effect; and that any additional amount is superfluous or harmful.

We have observed in our group of children all those signs which are commonly accepted as the results of digitalis on the heart and have not been able to determine that there is any difference in the quality of their reaction as compared with the reaction shown by adults. We have observed the appearance of a sinus arrhythmia as a very frequent occurrence, sufficiently frequent to make us believe that there is some distinct casual relation to the digitalis. This point, however, will bear further study. When we turn to the quantity of drug necessary to produce some effect on the heart, we have found that children with heart disease require more, about 50 per cent more, than do adults. Some of our children required 100 per cent more of the drug, that is, a quantity double the estimated dose, while others required only 10 per cent additional amount. We are not prepared to offer any explanation as to the reason for this difference in tolerance between children and adults.

We have observed that there are two types of cardiac children in whom the use of digitalis may be indicated. First, those children who come in suffering from heart disease who at the time are in a state of chronic cardiac failure. The majority of these children improve when they are put to bed, are put on restricted fluids, and are put to rest by opium. But a few warrant the use of digitalis as a further and probably a quicker means to provide relief. A second group of children are those in whom there is a regular heart action, but a rate more or less persistently accelerated. Provided other causes for the rapid action, such as pain, fatigue, fever, excitement, have been removed, digitalis may be used to slow the rate. On this point concerning the use of digitalis we are in agreement with Sutherland[5], who has called attention to the presence of a rapid regular persistent heart action associated with rheumatic fever, usually as a sequel to that infection.

It has been mentioned above that there is no indication for the use of digitalis in those children who are suffering from heart disease, but who are well compensated and are able to lead comfortable lives. Further than this there are children who have heart disease and who might receive no beneficial effect, or even might receive a harmful effect from digitalis when given in massive doses. Children who have acute infectious or toxic myocarditis may respond to lesser amounts of the drug than was estimated. Such children should be given a reduced amount or a smaller amount repeated over a longer interval of time. A second group of children who do not respond properly to massive doses of digitalis and in whom its use in such doses is contra-

indicated are those who have hearts that are already overloaded, that are dilated, that have a weak contraction. They particularly do not respond properly when contractions arising from ectopic stimuli persistently occur. These hearts under the stimulus of muscle failure are already putting forth a maximum effort, and under the whip of further stimulation from digitalis may balk and refuse to go further.

CONCLUSIONS

(1) The method of administering massive doses of digitalis to children should be the same in detail as for adults.

(2) The use of massive doses to children is entirely practical, and under proper supervision possesses no source of danger.

(3) That amount of digitalis necessary to produce clinical improvement coincides with the amount necessary to produce vomiting and a fall in heart rate. These two phenomena may be taken as criteria that an optimum therapeutic effect has been obtained.

(4) Children with heart disease require an amount of digitalis per kilo of body weight which is about 50 per cent greater than would be required for adults.

(5) There are two indications for the use of digitalis in children. First, those who are suffering from heart disease and who are in a state of chronic cardiac failure. Second, those who have a regular rapid heart rate when that heart rate cannot be slowed by other measures.

(6) Massive doses of digitalis are contraindicated in two groups of children with heart disease: first, those who have an acute infectious or toxic myocarditis; second, those who are suffering from acute cardiac failure with hearts that are overloaded.

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DISCUSSION

Dr. W. McKim Marriott, St. Louis, Mo.—Recently I was a member of a committee to investigate the dosage and use of drugs in children. One of the first things that struck us was that we had no rational basis for the use of many common drugs, and that when there was a rational basis the dose ordinarily given was not capable of producing the desired effect. It is only by such work as Dr. McCulloch's that we are able to know how large a dose to give.

We use at the present time about the same amount of digitalis that we formerly used, but use it differently. We have fewer children getting it and we are giving them larger doses. We believe a little bit of digitalis is like a little bit of diphtheria antitoxin. The old method was to give a little bit for several doses. Now we give a large dose at the start, enough to do something.

It is interesting to note in Dr. McCulloch's paper that he confines the use of digitalis to cardiac disease, and then only to certain types of cardiac disease. There is entirely too much digitalis given to children for simple "heart disease." Digitalis is often given to children with only a murmur and given to children who are up and around. It is evident that if a child needs digitalis he needs rest in bed even more. He should be kept in bed, and if digitalis is given at all it should be in a dose sufficient to accomplish the therapeutic result. The use of digitalis in such a disease as pneumonia Dr. McCulloch did not mention, because in children with pneumonia there is seldom a very good rationale.

Dr. H. Leslie Moore, Dallas, Tex.—I have been following for some time the work Dr. McCulloch has done in his studies on digitalis. In my part of the country we have very few cases of cardiac decompensation. Some two weeks ago a very far advanced case fell into my hands, which I determined to treat by Dr. McCulloch's method. The parents were very ignorant people and no results were obtained from the treatment. I used Squibbs' tincture of digitalis and increased the dose in a child of six years of age till he was getting a dram and a half a day, but still no result. At the end of a week I found that the parents had given the child less than one-half ounce during the whole week.

Dr. G. Canby Robinson, Baltimore, Md.—We have arrived at a stage in our knowledge of digitalis when we can to a great measure discard the work that has been done in the experimental laboratory in regard to its action on human beings. We have learned to use very accurate methods in the study of the drug in man and we now have many facts regarding the action of digitalis on man, so that we do not have to go back to the experimental work with animals. In the whole literature there is an absence of facts bearing on the action of this drug in children, and this work of Dr. McCulloch's comes to fill a well-defined gap in our knowledge.

As he says, observation of the heart rate and the occurrence of nausea and vomiting will tell us when we have arrived at a toxic dose of digitalis. One difficulty in the use of the drug is that the optimum therapeutic dose and the toxic dose are very close. One of the most important factors in the successful use of the drug is to recognize the early toxic symptoms and to know that they are often associated with the optimum therapeutic effects of the drug.

We have had an interesting experience with the use of massive doses. We followed the Eggleston method in adults and gave the drug in doses of 15 c. c. per 100 pounds of body weight, using the standardized tincture. That means giving sometimes 25 c. c. of the tincture of digitalis. Of course that is very much larger than the doses that have been previously used. We can give that amount without exceeding the therapeutic action and without getting many of the toxic symptoms of the drug. While I would not advise the general adoption of such large doses, I do feel that to the average adult weighing 150 pounds 10 c. c. of the tincture divided into two or three doses can be given with safety within 24 hours. It is very valuable to know that children can be given with safety somewhat larger doses relative to their body weight than are required for adults.

Dr. J. T. Halsey, New Orleans, La.—Dr. McCulloch's paper has brought to me the entirely new information that in children it is necessary to give larger doses in proportion to the weight than is necessary in adults. I believe also that in addition to the extreme importance of our recognizing the relatively small difference between the dose necessary to produce results and the dose larger than that which produces toxic results, it is necessary to remember that if you are going to give digitalis you have to give enough. If it takes six drams to produce a therapeutic effect in the adult you do not get one-sixth of that effect from one dram, one-third from two drams and so on. You may give nearly an adequate dose and still get no effect. I believe the safe, practical method of giving digitalis is to give as much as you dare give for the first dose, then wait four to six hours, when most of that effect will have been produced, and go cautiously uphill. I think, as Dr. McCuloch has shown, that the reason that the vast majority of physicians and those working with children have lost faith in digitalis, is because of the inadequacy of the doses given and because they have not recognized that the effect is not produced gradually but suddenly after a certain amount has been taken.

ENCEPHALO - MENINGOCELE THROUGH THE FORAMEN CECUM*

By W. L. Funkhouser, M.D.,
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The classification of congenital malformation in the region of the cranium has undergone no revision since Lyssenkow, in 1896. He divided all cases into two groups, the exencephaly and the cephalocele. In the former there is a general malformation in the development of the skull, while in the latter only a partial developmental failure. In the exencephaly there is an extensive gap in the cranial vault, the remaining skull being microcephalic. The ventricular spaces are usually distended with fluid. This class of cases we are not to consider.

In the cephalocele, however, the opening in the skull is circumscribed. The brain is more or less normal, although internal hydrocephalus can take place due to interference with the constant pressure. Occasionally the ventricles are distended with fluid. Embryologically, cephalocele results from incomplete cutting off of the neural canal in the head region of the embryo from the overlying epiblast, with consequent fusion of the primary neural tube with the primordial mesoblastic membranous cranium and with the overlying epiblastic surface. It is said to occur in the early stages of embryonic life, not later than two or three weeks.

Ssamoylenko states that cephalocele occurs only in the median line, especially in the region of the occiput and the root of the nose. He doubts the existence of lateral cephalocele. When located in the frontal region the tumor is usually small. It may project (Rawlings) through a deficiency in the cartilaginous base, either through the cribriform plate of the ethmoid or between the pre- and basi-sphenoid, forming a polypoid projection into the nose or naso-pharynx.

Von Bergmann divides the cases into:
Inoperable:

"(a) When associated with premature synosteosis and microcephaly.
"(b) When associated with hydrocephalus.
"(c) When associated with marked deformity.
"(d) When tumor is situated below external occipital protuberance."

Operable:

"(a) Limited protrusion with none of above defects and disadvantages.
"(b) Encephalocystocele.
"(c) Meningocele."

Lyssenkow reports 72 bone transplants. Thirty-nine lived and 33 died.

Rawlings states that even in operable cases, radical operation is carried out under great disadvantage, mortality being

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high. In the cases recovering the results in general are unsatisfactory.

REVIEW OF CASES REPORTED

Case 1.—Child one day of age seen at Czerny Clinic, University of Heidelberg. There was a broadening at base of the nose, skin blue and shiny. On the right side was a part of the tumor, but the main portion was on the left side. It was soft to the touch and became larger when the baby cried. It seemed to be painful and became smaller on pressure. A definite opening in the nasal bone could be felt. The tumor was hard at the base.

An operation was performed. The cystic part was cut off where it was attached by a pedicle; the hard brain tissue substance being left. Length of removed tumor, 2.5 cm. Ten days after operation

Fig. 1.—Just before operation.

child had convulsions, meningitis caused death shortly afterward. Post mortem showed small round opening, size of pen staff, on right side, the dura protruding as a sack in which was brain substance. On left side there was no opening in skull. In seven years the family had five children, none showing any developmental deformity. Then there was born a second case similar to the first. When brought to the clinic it showed a double-contoured tumor, 2 cm. x 1.5 cm. An opening in the skull could be felt, the edges of which were smooth. It did not pulsate and did not diminish in size upon pressure. The left side could be pressed back. Crying caused both tumors to become tighter. The tumors seemed separated, but a definite connection could be felt between them. No operation was performed. Subsequent result not reported.

Case 2.—Muscalette reports a case, aged 15 months. Upon left side of nose, a little to the left of the median line, was seen a tumor, present since birth, the size of an orange, covering nose and eye. It was soft, fluctuated and was translucent. It became only slightly smaller on pressure and could not be reduced; no pulsation, nor increase in volume on crying. Deep palpation demonstrated no opening in bone. By aspiration several cubic centimeters of clear yellow fluid were procured. Walls of sack were very thin. Operation exposed pedicle at base.

Case 3.—Mayer reported a case, aged three days, weight 5½ pounds. The left nasal opening broader than right, due to soft compressible tumor, hazelnut in size; one-half of circumference sticking out of nose. There was no increased tension on crying. On opening lower part a bloody serum exuded, and on pressure, purulent fluid. Pedicle

Fig. 2.—Seven months after operation.

was doubly-ligated. Muco-serous secretion continued to pass. Child died six weeks later with no definite meningeal symptoms, just a gradual loss of strength. Autopsy showed left nasal opening larger than right. Right frontal lobe could be lifted, but left was bound down. Projection of brain on left side ran through a cleft in cribriform plate close to cristi galli. Also from frontal lobe were nerve fibres enclosed in pia, running through the foramen cecum. In left part of lamina cribrosa there was an oval opening 1 x 0.5 cm.

REPORT OF CASE

Baby S., female, aged 7 weeks.

Family History.—Negative. Only child. No miscarriages.

Personal History.—Full term, normal delivery, good condition.

Previous Illness.—None.

Present Diet.—Nurses q. 3 h., and once at night.

Present History.—Brought for swelling about nose, which was noticed at birth.

Examination.—Bright, well-developed and well-nourished girl baby. Weight, 10 pounds, 14 ounces. There was nothing of importance except congenital tumors at base of nose. On each side at the base of the nose there was a fluctuating mass, on the right side about the size of a large hickory-nut, on left a hazel-nut. The right-sided tumor on pressure completely disappeared, while the left did not seem to be so easily or completely reduced. On examination of external opening there seemed to be a bony deficiency; internal opening not palpable. Eyelids, especially on the right side, were pushed outward, causing some deformity. Pressure over fontanelle did not increase tension of tumor, but pressure over masses was transmitted to the fontanelle. There was pulsation observed both by inspection and palpation. On crying there was no increased tension, but the contraction of muscles seemed to reduce tumors so that they almost disappeared. Dilated vessels appeared over the cystic masses.

The mass on right side was aspirated and 8 c. c. of clear fluid obtained, without any appreciable decrease in size of tumor. From the puncture there was a seepage into the soft tissue of eyelid and cheek, causing considerable edema. The puncture oozed for two days until a collodion dressing caused it to cease flowing. The examination of fluid showed a cell count of 6, reduced Fehling's and gave a two-plus Wassermann. X-ray examination showed a partial defect in the cribriform plate of the ethmoid bone.

Subsequent examination showed that the deformity was increasing, so on October 6, 1920, the child being aged 7 months, was referred to Dr. Chas. Dowman for examination and operation. At this time the examination showed a tumor extending across bridge of nose, 4 cm. It had 2.5 cm. vertical measurement on right side; 1.5 cm. vertical measurement on left side. The overlying skin seemed to be freely movable and contained small venules. The distance between patient's eyes was 4.5 cm., the lids of the eyes being distinctly impinged upon by the tumor. This was especially marked on the right side. The consistency of the tumor was very soft and it fluctuated. The bridge of the nose seemed to be involved in the tumor, there being a slight gap between the bony part and the cartilaginous part of the nose. When the child cried the tumor seemed to get slightly harder though it did not increase in size. There was no distinct pulsation in the tumor felt, although there was a pulsation on careful inspection, especially the right side of the tumor. Pupils were equal and reacted to light. Eye grounds seemed normal.

Operation was advised and consented to; and following is report of the operation performed:

A double frontal bone flap laid down, with the pedicle of each flap in the temporal region. In order to relieve to a certain extent the subdural pressure a small incision was made in the dura, with the idea of doing a ventricular puncture. Instead of coming down on brain cortex, however, the arachnoid was found to be enormously distended with fluid, so that by pricking it, enough cerebrospinal fluid escaped to relieve the subdural pressure. The dura overlying both tips of the frontal lobes and the attachment between the lobes to the bone was now gradually stripped off until the region of the foramen cecum was reached. At this point the margin of the skull-defect was found. This was principally on the right side, approximately 1½ cm. in diameter. Instead of the dura being continuous through this defect as in a meningocele, there was a distinct edge of the dura found at the margin of this opening. Through the dural defect there extended down into the tumor a projection of brain substance, covered over with arachnoid. This arachnoid was nicked, allowing the fluid to escape. The portion of brain which projected down into the tumor was now partially ligated with silk sutures and partially divided on the distal side of the sutures. By careful manipulation the brain projection was now pulled out of the tumor sac. From the tip of it there extended nerves which pointed toward the inferior part of the sac. These evidently were olfactory nerves. They were pulled away from their attachment to the inferior wall of the tumor, and the whole brain projection was then removed from the sac, but was not excised. The opening through the skull was now brought into view. A piece of fascia lata was placed in the defect, and on the inner side of this, i. e., on the brain side, a piece of removed skull was placed. It was impossible to suture the edges of the dura so that one had to be content with this attempt to block off the opening into the tumor sac.

The bone flaps were now replaced and the wound closed with continuous fine catgut sutures and continuous silk scalp sutures. Recovery was uneventful.

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RURAL ADMINISTRATION OF ANTI-SYPHILITIC TREATMENTS

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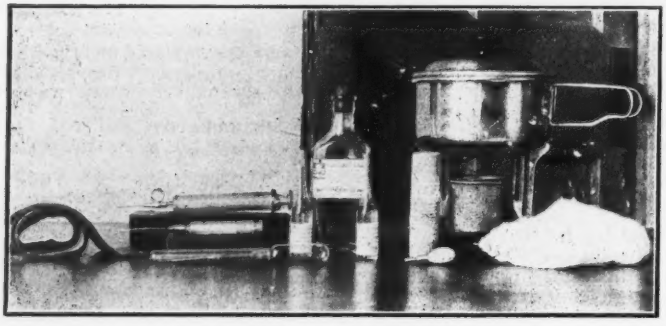
The following description of an inexpensive outfit for use by doctors in rural communities and small towns for intravenous medication may prove of interest.

Of course, readers of this article will realize that I am not advocating crude methods of practicing medicine, but I do believe that the outfit described herein will help solve what is now a problem for many physicians. Of course, those practicing in the large cities with adequate facilities at their disposal will not be particularly interested. But so many doctors are practicing under difficulties that I hope this simple outfit will be found helpful.

Some time ago I was asked by the Executive Officer of the State Board of Health how many doctors in Mississippi were using intravenous medication in the treatment of syphilis. I was unable to say, but upon investigation I found that the percentage was very small. The reason given for not using neoarsphenamin



was that it was too difficult to obtain freshly-distilled, sterile water, and that to maintain a place for the sterilization of syringes, etc., was too much trouble for the average practicing physician to whom occasional patients with syphilis would come. It was plain that if the general practitioners were to be interested in giving intravenous medication that some simple method must be devised which could be adopted by them. Acting on this conclusion, the following provisions were made:

The State Hygienic Laboratory was requested to put up sterile, distilled water in 15 c. c. sealed ampules. These were sent to any physician, free of cost, upon request. A few of these ampules of distilled water, together with two Luer syringes, one 10 c. c. and one 2 c. c. with needles 20x¾ and 20x1¾, a 4-ounce bottle of denatured alcohol, an ounce of cotton, the neoarsphenamin and the mercury in oil for hypodermic use, together with a sterno heating unit, can be carried in a physician's small satchel. With this equipment neoarsphenamin can be given a patient just as safely and scientifically as in a hospital.

The sterno heating stove is lighted and the syringes and needles put in to boil. After their sterilization is accomplished the 10 c. c. syringe and the 20x¾ needle are washed out with sterile, distilled water from the first ampule, then the syringe is filled with sterile, distilled water from the second ampule. The end is pinched off the neoarsphenamin ampule and a solution is made in the ampule, which concentrated ampule solution is taken up in the 10 c. c. of sterile water in the syringe. The patient's vein is isolated by applying a tourniquet made from the inner tube of an automobile tire; the arm is cleansed with denatured alcohol; the needle is inserted into the vein; the plunger is drawn back to see that blood enters the syringe and then the neoarsphenamin is slowly given.

Three precautions are necessary:

(1) That the syringe be cooled;

(2) That the needle is in the patient's vein; and

(3) That three minutes, at least, be required to give the dose.

When mercury is to be administered the 2 c. c. syringe with the 20x1¾ needle is used. The syringe should be hot enough to liquify the oil. The upper, outer quadrant of the buttocks is cleansed with the alcohol and after the syringe has been loaded and air expelled the needle is inserted as far as the shank will allow it to go. The plunger is withdrawn slightly to see if any hemorrhage appears in the syringe which would indicate that the needle is in a vein. If no such hemorrhage exists, the dose of medicine is slowly expelled, after which the site of the puncture

is lightly massaged. If a vein has been entered, the needle is withdrawn and inserted into another place.

The outfit described is practical for giving neoarsphenamin. The whole apparatus, not including the medicine, should not cost over $3.00.

A UNIQUE CASE OF CHRONIC MORPHINISM*†

By Samuel T. Lipsitz, M.D.,
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This case is reported on account of its unusual history. It appears to be the only one of its kind mentioned in the literature.

The patient, a white girl of fourteen years, Hospital No. 9476 (and her mother, Hospital No. 9475), entered the Unit No. 2 Service of the St. Louis City Hospital on January 25, 1921, to be treated for chronic morphinism.

The patient's mother, forty-nine years of age, had been a morphin addict for twenty years. Recently the average daily quantity she had taken had been from four to eight grains. Her general condition had been fairly good and she was found to be of an intelligent and refined type. Fourteen years previously, when she was pregnant with her daughter, she was taking morphin daily. When the child was born the mother was told that in order that the infant might live it would be necessary to give her small doses of morphin. This practice was continued daily from the time of birth and the girl had had morphin in ascending doses until the time of admission. She had not missed a day since she was born and was then getting four to six grains each day by mouth. It was first given her in "small amounts" measured on a knife blade and mixed with milk. The child was breast-fed for about one month.

The patient was found to be tall, thin and pale. She showed no definite signs of physical or mental degeneracy or of organic disease. Her intelligence was deficient mainly because of insufficient schooling. On account of constant illness associated with her morphinism she was out of school all but one year. The girl complained of severe pains radiating upward to the abdomen and of general weakness. This was most severe when the effects of the morphin would wear off. The bowels were usually constipated. The menstrual flow had not appeared. The girl was somewhat anemic. The chest was flat. She was slow in developing her secondary sexual characteristics. The abdomen was somewhat sunken. The systolic blood pressure was only ninety-five.

At the hospital the morphin was gradually reduced and finally discontinued. Substitutes were employed and forced feeding was instituted. The girl left the hospital in an improved condition, apparently cured of the habit.

As morphin is carried to the embryo by the maternal blood, this patient had received the drug from the beginning of her embryonic life through the maternal blood supply, and then by mouth in increasing doses from the day of her birth until the age of fourteen years.

Furthermore, it is interesting to observe, as exemplified in this case, that the fetus can establish a tolerance for large quantities of morphin, despite the fact that while circulating in the placental blood it has not infrequently been found to produce fetal death. In addition, the patient survived the trials of early infancy while receiving daily ascending doses of this potent drug.

While there does not appear to be an identical case in the literature, there are comments to be found, important and noteworthy. It is interesting historically that the first thorough discussion of the effect of morphin on the fetus occurred in connection with Munde's[1] case report of a woman who took from twelve to sixteen grains of morphin daily during the entire period of gestation. The infant was normal. The conclusion reached was that the fetus gradually became habituated to the morphin.

According to Senator,[2] menstruation often ceases in women morphinists and sterility is common. This explains the scantiness of the literature concerning the effects of morphin on the offspring. In addition, abortions are very frequent among such addicts. Ehrenfest[3] believes that this is probably due to a combination of the effects of morphin, alcohol and other drugs, with venereal disease. In 1895[4] the presence of morphin in the placental and fetal blood was first demonstrated.

Happel[5] stated that children of mothers prenatally addicted to morphin are frail and nervous and usually succumb early.

*From the service of Dr. Charles H. Neilson, Department of Internal Medicine, St. Louis University School of Medicine, St. Louis City Hospital.

†Dr. Lipsitz died September 2, 1921, after the preparation of this case report.

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SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

A REVIEW OF 300 CASES OF BREAST DISEASE*†

By Irvin Abell, M.D.,
and
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The material upon which this review is based consists of 300 cases coming under observation up to and including 1920: 138 carcinomata, 2 sarcomata, and 160 of various types of non-malignant disease. Of the carcinomata, 136 occurred in women and 2 in men. Both of the sarcomata occurred in women and of the 160 cases of benign disease, 159 occurred in the female and 1 in the male breast. Of the 297 women, 198 were married and 99 unmarried, a proportion of 2 to 1. One hundred of the carcinomata occurred in married and 36 in unmarried women, a proportion of almost 3 to 1. Ninety-eight cases of benign disease were observed in married and 61 in unmarried women, a proportion of 3 to 2. Of the 3 men, 2 presented carcinoma and 1 benign disease. The preponderance of breast disease in married women doubtless finds its explanation in the changes dependent upon and following lactation. The circulatory and cellular changes in the breast incidental to pregnancy will as a rule greatly activate pre-existing breast disease. Cancer occurring in the lactating breast usually pursues a rapid course. But one such occurred in this series, developing in a woman of 36 (No. 3655) in the fifth month after delivery, the growth being adeno-carcinoma. Following radical operation she has remained well up to the present time, a period of 7 years.

*Read in the Section on Surgery, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

†From the Surgical Service, St. Joseph's Infirmary and the Pathological Department, University of Louisville.

AGE

CARCINOMA		BENIGN BREAST DISEASE	
Number of cases	138	Number of cases	160
Average age of 125 cases	47.8 yrs.	Average age of 157 cases	35.4 yrs.
Occurrence by decades:		Occurrence by decades:	
1st decade	0	1st decade	0
2nd decade	0	2nd decade	2
3rd decade	3	3rd decade	48
4th decade	19	4th decade	48
5th decade	47	5th decade	48
6th decade	38	6th decade	10
7th decade	15	7th decade	1
8th decade	3	8th decade	0
Youngest patient	26	Youngest patient	17
Oldest patient	78	Oldest patient	63

SARCOMA

Two cases. Ages 42 and 61.

The greatest incidence of carcinoma occurred in the fifth decade, 47 cases, while in the benign series the 3rd, 4th and 5th decades each showed 48 cases. In women over 50 years of age there were 56 cases of cancer and only 11 of benign disease. Between the ages of 40 and 50 they were about equally divided, 47 of cancer and 48 of benign disease, while under 40 years of age there were 22 cases of cancer and 98 of benign disease. It has been our observation that in cancer the younger the patient, the more rapid the growth and the earlier the dissemination. The 3 patients under 30, all subjected to radical operation, showed prompt recurrence, metastasis and early death.

LOCATION

RIGHT BREAST		LEFT BREAST	
Carcinoma	54	Carcinoma	79
Benign	63	Benign	68
Sarcoma	1	Sarcoma	1
Tumors of same type in both breasts			
Carcinoma	2	Carcinoma in 1 breast with benign tumor in opposite breast	2
Benign	30		
Side containing tumor not mentioned in history	7	Carcinoma of accessory mamma (left side)	1

Carcinoma was met with in the left breast oftener than in the right, in the proportion of 3 to 2. We believe that more "cures" will be obtained when the growth is in the outer than when in the inner quadrants due to the anatomy of the lymphatics. When in the outer quadrants the early metastasis is as a rule in the axilla and acessible to removal. When in

the inner quadrants, early metastasis to the mediastinum, to the abdomen and to the opposite breast and axilla will render the condition hopeless of permanent cure. Of the two cases presenting carcinoma in both breasts, one underwent a radical amputation of the right breast for scirrhus carcinoma at the age of 37 and returned 7 years and 7 months later with a growth of the same type in the left breast. In the second case an interval of five years elapsed between the removal of the left breast and her return with a carcinoma in the right breast without evidence of disease elsewhere. In two cases, carcinoma of one breast was associated with chronic mastitis of opposite breast, ages 35 and 58. In 1 case an accessory mamma was the site of the disease, the breast proper not being involved.

DURATION OF SYMPTOMS

Carcinoma,	Benign,
average .....15.8 months	average .....17.2 months
Shortest history.....2 days	Shortest history.....1 day
Longest history....10 years	Longest history.....40 years

Duration of symptoms in 2 cases sarcoma, 2 weeks and 96 months.

From a study of the cases of carcinoma giving a history of long duration of symptoms, from 3 to 10 years, it is clear that a vast majority if not all were superimposed on benign disease. This fact is a potent argument for the removal of all breast tumors as soon as they develop even though it be admitted that benign tumors may persist without undergoing malignant transformation. One such, in this series, if we accept the patient's statement, had existed 40 years. It is our earnest belief that every tumor of the breast, regardless of age of patient, should be removed. The average duration of symptoms in this series, carcinoma 15.8 months, benign lesions 17.2 month, would indicate the necessity for every physician to cooperate actively with the American Society for the Control of Cancer, to the end that such cases may be brought under observation at a time most favorable for efficient treatment.

PREVIOUS HISTORY OF ABSCESS OR INJURY

Stated in 53 Histories.

CARCINOMA		BENIGN	
Abscess negative	9	Abscess negative	8
Injury negative	3	Injury negative	3
Abscess positive	8	Abscess positive	9
Injury positive	5	Injury positive	8

Of these 53, 17 gave a history of abscess and 13 a history of injury. It may be doubted that any acute trauma could be productive of tumor except in an indirect manner by producing mastitis which might be a forerunner of cancer. It is more probable that the trauma was coincident with the appearance of the growth or else served to attract the patient's attention to one that already existed. The changes dependent upon abscess formation are such that we believe them to be an important factor in the subsequent development of neoplastic disease.

LOCAL CHARACTER OF DISEASE

Tumor Single Carcinoma	124	Tumor Single Benign	86
Tumor Multiple Carcinoma	11	Tumor Multiple Benign	22
General Thickening Carcinoma	2	General Thickening Benign	54
Tumor Single Sarcoma	2	No Enlargement Found Benign	12

Number of cases of carcinoma having palpable axillary glands 95

Carcinoma of the breast presenting multiple tumors is in our experience practically hopeless as regards permanent cure, the extension of the disease being such that inaccessible metastases are present. The two cases presenting general thickening were instances of the so-called Volkmann's cancer, rapid in growth, involving the entire breast, the skin being hyperemic and of pigskin character. In one of them, a woman of 34, the tumor had existed 3 months. Following radical operation with a wide resection of skin, multiple skin metastases were evident at the end of 4 weeks, and death from general carcinomatosis occurred 8 weeks later, 6 months from the onset of disease and 3 months after radical amputation. The second case was observed in a woman 54 years of age, clearly inoperable 4 months from time she had first noted tumor.

One or more axillary glands were palpable in 95 cases, and microscopical examination showed that many such were due to toxic lymphnoditis. Unless the enlarged glands are densely hard and shotty or massed together it is practically impossible to determine their malignancy by palpation previous to operation.

The 54 cases of benign disease presenting general thickening were instances of chronic mastitis while the 12 in which no

enlargement was found comprised a group in which tenderness was present at all times associated with swelling and pain at the menstrual periods, a mastitis without demonstrable hardness, thickening or irregularity in contour.

OPERATIONS

Radical Amputations	107
Excision of Tumors	47
Conservative Amputations	35
Evacuation Mammary Abscess	2
Excision of cancer of accessory mamma and axillary glands	1
Number of cases having previous operations elsewhere	11
Number of cases operated upon: carcinoma 110, sarcoma 2, benign 80.	

The benign lesions removed by operation comprised adenomata 6, fibromata 5, cystadenomata 4, fibroadenomata 6, adenofibroma 1, intracanalicular papillary adenomata and fibroadenomata 8, chronic mastitis with adenoma 21, chronic mastitis 26, tuberculosis 1 and Paget's disease 2. In 8 cases of chronic mastitis and 10 of chronic mastitis with adenoma the portion of breast containing tumor was resected while in 18 cases of chronic mastitis and 11 of chronic mastitis with adenoma conservative amputations were done. In 1 adenoma, 3 cystadenomata and 1 intracanalicular papillary adenoma conservative amputations were done because of presence of second degree epithelial hyperplasia. The tuberculous breast was treated by amputation with removal of axillary glands and the 2 cases of Paget's disease showing no microscopic evidence of cancer were treated by conservative amputation.

PATHOLOGICAL STATISTICS

Number of cases having microscopical examination		143
Number of frozen section examinations made		56
Cystadenoma	8	
Adenofibroma	5	
Chronic Cystic Mastitis	8	
Fibroma	4	
Adenoma	3	
Carcinoma	28	
Number of cases in which fixed tissue examination modified frozen tissue diagnosis		2
Number of cases in which condition of axillary nodes reported in radical operations for cancer		43
Number of cases showing metastasis in axillary nodes		32
Number of cases showing absence of metastasis in nodes		11

The extent of the pathological examination has been in most part limited to the making of a correct histological diagnosis. We selected the following series of 53 breasts for a more detailed study.

CLASSIFICATION BY PATHOLOGY AND AGE

	10 to 19 years	20 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	Totals
Chronic Mastitis		1	3	4	3		11
Chronic Mastitis and Adenoma	1	5	6	8			20
Adenoma		4	2	1			7
Chronic Mastitis and Carcinoma			1				1
Adenoma and Fibrosarcoma					1		1
Chronic Mastitis, Adenoma and Fibrosarcoma				1			1
Adeno-Carcinoma of Breast				2	1		3
Adeno-Carcinoma of Breast and Node				2	5	2	9
Totals	1	10	12	18	10	2	53

A review of the sections cut in the study of these shows several interesting facts of which perhaps three are most significant: first, that 19 of 42 patients showing epithelial neoplasms were less than 40 years of age; second, that in at least 21 the routine sections showed distinct relationship between chronic cystic mastitis and undoubted epithelial neoplasm; third, that in 21 cases in which rush diagnoses by means of frozen section were made at time of operation, these were confirmed by subsequent multiple imbedded sections and were modified in only 2. In 1, simple adenoma was added to chronic mastitis and in the other, fibrosarcoma and chronic mastitis were added to simple adenoma.

The incidence of chronic mastitis, a condition in which the interstitial tissue is infiltrated with lymphocytes and plasma cells chiefly and in which cyst formation may or may not be present in connection with epithelial neoplasms, is a matter of common observation to any studious surgeon who has systematically subjected his specimens to microscopical examination. While it cannot be said that chronic mastitis is a causative factor in the production of epithelial neoplasms, there is abundant evidence that such a continued source of irritation in the breast renders the patient more liable to the development of such tumors.

The second point of interest may well bear some emphasis. Although the progressive members of our profession fully appreciate that cancer is not altogether a disease of old or middle age, yet many practitioners and certainly the majority of the laity still labor under that delusion. Not infrequently a woman is advised to report occasionally to be watched and

eventually when the watcher reaches the conclusion that possibly the mass under observation may really be a cancer after all, it is so late that prognosis after radical operation is bad. In no condition is this policy of "watchful waiting" more disastrous.

The third point is one on which both the authors have strong opinions. While it is true that pathologists may differ on the interpretation of a borderline case, to say that a surgeon from the clinical history and gross pathology can make more reliable deductions as to malignancy than can a trained and experienced pathologist with the microscope is to argue absurdly. How can a surgeon or a pathologist better improve his judgment than by checking the two points mentioned with a microscopical examination and subsequent clinical developments? With us it is the practice in all cases at all doubtful clinically to remove the section of breast containing the tumor and to examine at once the gross pathology, forming an opinion if possible. This is followed immediately with frozen section and microscopical examination. The block frozen is always subsequently imbedded and sectioned for confirmation. We believe this practice has greatly improved our ability to interpret gross pathology, but we are unwilling to rely entirely on it when the question at issue is so fraught with possible disaster to the patient in the event of erroneous diagnosis. For example, in the case of a woman 35 years of age (OS 17-285) whose three sisters died of carcinoma, the right breast appeared clinically and in its gross pathology on first inspection to be only chronic mastitis, but after the specimen was taken to the microtome room gross sectioning and a more careful examination disclosed a portion about 1 cm. in diameter which was harder than the remainder. A frozen section through this portion revealed typical adenocarcinoma which was confirmed by several subsequent permanent sections.

In two of this series mixed tumor was found, epithelial and fibroblastic, the latter part very cellular and showing comparatively undifferentiated cells with occasional mitoses (fibrosarcoma or "spindle cell" sarcoma). Mixed tumors are not uncommon when one is benign. Multiple malignant tumors showing different cell types are exceedingly rare. One other point of interest is that the 6 scirrhous types of adenocarcinoma occurred at the ages of 48, 50, 53, 58, 61 and 62. The slow growth and lack of recurrence or delayed recurrence in breast carcinomata showing a large amount of fibrous tissue stroma, especially if the latter is hyalinized, has been pointed out by many observers.

OPERATIVE RESULTS

Number of cases of carcinoma operated upon	110
Number of cases "living and well"	49—44.5%
Number of cases known to be dead	34—31 %
Number of cases dying in hospital (operative mortality)	4— 3.6%
Number of cases dead "cause unknown"	11—10 %
Number of cases dead, "recurrence"	19—17.4%
Letters to carcinoma cases returned "unopened"	12—11 %
Letters to carcinoma cases "unanswered not returned"	10— 9 %
Number of cases living but having recurrence	5— 4.5%

Of the 110 cases we have succeeded in tracing 88, of whom 49 are "living and well," 5 are living with recurrence and 34 are dead. Of the letters sent to the remaining 22, 12 were returned unopened and 10 were unanswered and not returned. Of the 4 cases dying in the hospital, 1 died under nitrous oxid-oxygen anesthesia, 1 died of acute cardiac dilatation six hours following operation, 1 died of cardio-renal disease on the 7th day following operation, and 1 died on the 15th day following operation, cause not stated.

GLANDULAR INVOLVEMENT (GROSS OR MICROSCOPIC)

Number of cases dead showing glandular enlargement	30	88.2%
Number of cases dead, no axillary enlargement	3	8.8%
Number of cases dead, no note on axillary condition	1	2.9%
Number of cases "living and well" having axillary enlargement	26	53 %
Number of cases "living and well" showing no axillary enlargement	23	47 %
Number of cases diagnosed carcinoma on frozen section traced	25	
"Living and well"	19	
"Died of recurrence"	4	
"Living with recurrence"	2	

DURATION OF APPARENT CURE

Number of cases of carcinoma "living and well"	49	
Living 16 years after operation	1	
Living 14 years after operation	1	
Living more than 5 years and less than 10 years	25	
Living more than 3 years and less than 5 years	4	
Living less than 3 years	18	
Number of cases of carcinoma operated upon 3 years or more	72	
Number of cases "living and well" 3 yrs. or more	31	43 %
Number of cases of sarcoma operated upon	2	
"Living and well"	2	
Number of cases of benign diseases (not including abscesses) operated upon	78	
Number of cases of benign disease traced	62	
Number of cases of benign disease having recurrence	5	8 %
Number of cases of excision of benign tumor traced	34	
Number of excision of benign tumor cases having recurrence	5	14.7%

RECURRENCE

In the earlier carcinoma cases of this series recurrence in or near the site of incision was not infrequently noted. Later with the employment of wide skin resection, recurrence at this site has been rare. The supraclavicular glands, lungs and mediastinum have been the most frequent sites of secondary deposits. This has been noted with such frequency that we consider it advisable in all cases to ray the chest before operating. Of deposits in the osseous system, the ribs and sternum present the greatest number, with 4 in the vertebral column and 3 in the femur. Metastasis to the liver and abdominal organs has been infrequent.

Of the 28 cases of conservative amputation traced all were well. Of the 34 cases of excision of tumors traced, 5 reported recurrence; of the 5, 2 were chronic mastitis with adenoma, 1 chronic cystic mastitis, and 2 adenomata, 1 of which was single and 1 multiple with 2 tumors in right breast and 1 in left.

DISCUSSION

Dr. W. W. Crawford, Hattiesburg, Miss.—We have been told that practically 80 per cent of all breast tumors are potentially cancer. We are told also that if we operate upon breast tumors, benign and malignant alike, before the axillary glands are involved we may expect 80 per cent of cures. We are confronted with the humiliating fact, however, that fully 80 per cent of the cases that consult the surgeon have axillary involvement. This means that the public has not yet reached that state of appreciation of this important disease that it should have reached. It means that the physician, the surgeon and the public health authorities have not yet reached that state of perfection in this regard that characterizes the study of tuberculosis and other great questions of health.

If, therefore, I have any message for you today in reference to this matter it would be in regard to that situation. Those of us who are especially emphasizing the subject of surgery should carry to our respective localities the determination to do our full duty to the public with reference to this disease. It is interesting to note that under Dr. Abell's activity this educative influence has already permeated the county adjacent to Louisville. While 80 per cent of the cases come to us with malignancy already established, he shows that 160 out of his 300 cases were benign tumors. This means that there has gone out from Louisville the influence that should go out from every community, that will ultimately reduce the mortality 50 per cent. The profession, for the first time in the history of our country, has decided upon a definite program and has just gone through with a National Cancer Week. The layman everywhere has had brought squarely before him the great importance of this question. As a result of this campaign I dare say there are many of you who have already been consulted by those who had actual cancer, or imaginary, or really benign tumors of the breast, and that you will as the weeks and months go on become more and more impressed with the influence of this systematic educational campaign along this line. It was our pleasure in Mississippi to have Dr. Joseph Colt Bloodgood, of Johns Hopkins, spend a week with us recently, and already we have noticed a reflex from this educational work of his.

THE VALUE OF BLOOD CHEMISTRY TO THE SURGEON*

By Wm. H. Bailey, A.B., M.D.,
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The value of blood chemistry to the surgeon is in most instances not different from the value of blood chemistry to the internist. Both are equally interested in its value in the diagnosis, treatment and prognosis of pathological conditions.

GLUCOSE TOLERANCE TEST

Among the several tests to which our attention is being directed is the glucose tolerance test. In this test 100 gm. of glucose are given by mouth in 300 c.c. of ice water to which the juice of one lemon has been added. This is best administered on an empty stomach in the morning before breakfast. The blood sugar is determined just before ingestion, 45 minutes after and again 2 hours later. In a normal individual the blood sugar which is usually 0.06-0.12% will be seen to rise above the normal to about 0.15% in 45 minutes and decline to normal again by the two hour period.

A high blood sugar content has been known for many years to be present in the patient with cancer. In carcinoma patients the glucose tolerance test shows a rapid rise in 45 minutes to a point above what is usually found in normal persons and the per cent continues to rise or remains stationary for the two hour period and then in another 1 to 2 hours slowly

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drops back to the normal for that patient.

Rohdenburg and his co-workers state that the location of the cancer bears no relation to the glucose tolerance test. They found similar results in primary carcinoma of the lungs, sigmoid, stomach, and other internal organs.

Friedenwald and Grove have shown that over 50% of the cases of gastro-intestinal carcinoma give this typical sugar tolerance curve. They also found that cases of sarcoma, syphilis, and other chronic conditions of the gastro-intestinal tract do not give such a curve. According to these authors it is therefore in the differential diagnosis of carcinoma of the gastro-intestinal tract that the glucose tolerance test, as shown by the blood sugar curve, is of considerable assistance.

Various observers have noted similar results in other conditions than cancer, especially diabetes, pituitary cases and hyperthyroidism. It is therefore necessary to eliminate these conditions by clinical methods before much weight can be given to the glucose tolerance test in the establishment of a diagnosis of gastro-intestinal carcinoma. It is also important to rule out pyloric obstruction as, of course, glucose ingested must be absorbed into the circulation which is not done to any appreciable extent from the stomach.

The value of this test was shown in a patient who recently presented himself to the clinic for relief from stomach trouble which had lasted over a period of years. The patient was intensely jaundiced, had pain on taking food, vomited frequently, and had lost considerable weight. The pre-operative diagnosis was carcinoma of the head of the pancreas. The blood sugar tolerance was found to follow a normal curve. At the operation a tumor mass of stony hardness with extensive adhesions was found close to the head of the pancreas. This was called an inoperable carcinoma and preparation made to close. During further manipulation to see if a gastro-enterostomy could be done, a hard mass with sharp edges was discovered which was found to be a gall stone. On further search several other stones were found and removed. The case proved to be one of gall stones impacted in the common-duct and not one of carcinoma. The absence of carcinoma had been indicated by the normal blood sugar tolerance curve.

ACIDOSIS

Many surgical deaths following operation for septic conditions should be reported as due to acidosis rather than some other cause. An individual cannot live unless the blood is alkaline. This alkaline balance has been shown by Henderson to be maintained by certain buffer salts in the blood. The degree of alkalinity of the blood is represented by its H-ion concentration and the carbon dioxid combining power of the blood plasma. When the H-ion concentration of the blood is lowered even a very little the blood is unable to carry the carbon dioxid to the lungs, the normal equilibrium is lost and acidosis begins.

Ether anesthesia has been shown to produce an acidosis, so that if a previous blood chemical examination shows the H-ion concentration to be low or the combining power of the blood plasma for carbon dioxid to be lessened, ether should not be the anesthetic selected. If ether has to be used, pre-operative treatment of the patient should be given to bring these factors back to normal.

Cases of gastro-intestinal disorders which have been unable to take sufficient food for long periods are very apt to have a starvation acidosis. When this condition is found to exist, by previous blood chemical tests, a two-stage operation may well be considered as being of a distinct advantage to the patient.

FUNCTIONAL INEFFICIENCY

In the last few years our attention has been called to the importance of pathological physiology. It does not matter so much whether an organ is diseased. The point to be determined is, what is the functional capacity of the diseased organ in question. The functional tests of the various organs or systems are of great importance in estimating the physiological state of the patient. A poorly functioning organ is to be feared more as a factor bearing on the "operative risk" in a patient than a diseased organ that is doing its work satisfactorily.

The functional inefficiency of one organ or system that would be definite enough to be demonstrated by specific tests may be entirely compensated for by the hyperactivity of a corresponding organ or some associated system. The skin can in a measure take up the work of excretion of the kidneys. One ductless gland may assist in carrying on the work that another has failed to perform. One kidney hypertrophies when the other has been thrown out of commission. It is therefore necessary to weigh such results regarding the functional ability of any organ in conjunction with the other clinical and laboratory data available.

Just as a chronic heart condition will sooner or later nearly always secondarily affect the function of the kidneys, so also the deficiencies of many of the metabolic processes of the body will ultimately lower the function of the kidneys. We must investigate not only the ability of the kidneys to excrete normal and abnormal substances but we must find out by blood chemical tests what substances, especially of the non-protein nitrogen of the blood they are not excreting. It is supposed that it is the retention of these elements that is harmful to the patient.

The surgeon has been quick to take advantage of the assistance that the routine blood counts, urinalyses, and other laboratory tests can give him in the working out of diseased conditions. Without lessening his efforts to make a diagnosis of the pathological lesion in his patient, the surgeon must also make a careful study to determine the functional abiltiy of his various organs. He must accurately estimate his resistance, his vitality, his physiological state; in other words, his "operative risk." It is this special point that the surgeon alone must decide. It is in assisting him to decide this special point that blood chemistry is of its greatest value to the surgeon.

Geraghty and Rowntree have given us a very valuable test for kidney function in their phenolsulphonephthalein or P-S-P test. The test meal for renal function of Mosenthal and Lewis or the 2 hour urine test is also a valuable aid. To these two must be added the estimation by chemical methods of the non-protein nitrogenous elements retained in the blood. The estimation of Ambard's co-efficient or its modification by McLean which is the numerical expression of the relation between the concentration of the blood urea and the rate of urea excretion in the urine, has been found of definite value by some workers. Others, and these include Folin, are inclined to be rather skeptical of the additional information given by these factors.

Each of these several tests that have been established for the estimation of renal function has its own particular place, each has certain points of value, and from each different important deductions may be drawn. They do not give us the same information as do the various tests for albumin in the urine. Therefore, no one test should be used to the exclusion of the others.

The P-S-P test has been used extensively as a single test in estimating the renal function and will be found usually to show a close agreement with the other tests. Frank has come to the conclusion that in some cases the dye acts as a diuretic, probably by its irritation of the kidney, and causes a polyuria, which of course will give a false idea of the normal eliminating power of the kidneys. He has come to look upon an output of over 75% in 2 hours as a sign of lessened renal function, especially where there is other evidence to indicate this condition. In these cases the blood chemistry will give a truer idea of the functional ability of the kidneys.

In the same way a low P-S-P result is not always a contra-indication for surgery nor an indication of a serious impairment of the kidneys, especially when the retention products as shown by blood chemistry are not found to be excessively high. A case illustrating this point was one that we observed a short time ago.

A pregnant woman developed symptoms of a toxemia of some nature. Of course eclampsia was the first thought. Her P-S-P output was 5% the first hour and 5% the second hour. The blood chemistry showed her total non-protein nitrogen and her urea nitrogen to be well within the normal limits. A voided specimen of urine showed a large amount of albumin, no casts and many pus cells. A catheterized specimen showed similar findings. There being no cystitis present the case was diagnosed a pyelitis. Proper treatment

was instituted and the patient's symptoms cleared up rapidly. She was sent home in a short time to await her delivery.

Frank also makes the point that a high urea nitrogen content of the blood is always significant of lessened kidney function regardless of what Ambard's coefficient or the P-S-P test show.

The non-protein nitrogenous elements retained in the blood include, beside the total non-protein nitrogen, or N-P-N, the uric acid, the urea nitrogen, the creatin and the creatinin. The technic of the various procedures in estimating these substances does not concern us at this time. It has, however, been emphasized by Myers that although most of these tests are fairly simple to one who has an average amount of chemical skill you cannot expect to get satisfactory results if these examinations are left to an office girl or even a nurse who is not thoroughly familiar with the chemical procedures involved. The preparation of the standard solutions and reagents alone requires considerable chemical ability. Even if properly prepared solutions are bought they must be checked frequently to ascertain if they have remained correct.

The normal for the factors under consideration, although varying somewhat as given by the different authors are about as follows:

Non-protein nitrogen	25	–35	mg. per 100 c.c. of blood
Uric acid	0.5	– 3	mg. per 100 c.c. of blood
Urea nitrogen	10	–18	mg. per 100 c.c. of blood
Creatin	5	–10	mg. per 100 c.c. of blood
Creatinin	0.8	– 2.5	mg. per 100 c.c. of blood

It has been found that as the kidney function lessens the uric acid is the first to accumulate in the blood, then the urea and finally the creatinin. This "stair-case" fact of retention would indicate that creatinin is the easiest of the three substances to be eliminated and uric acid the most difficult. When the kidneys are unable to eliminate creatinin properly their function has been dangerously impaired. This is a valuable prognostic fact as it is pretty well established now that cases with over 3.5 mg. of creatinin per 100 c.c. of blood are very poor surgical risks. Cases with above 5 mg. per 100 c.c. rarely show improvement on treatment and almost invariably die within a comparatively short time.

Any extensive pre-operative study of the patient will of course consume considerable time. However, there is often some slight tendency among surgeons to rush their patients to the operating room. I believe this condition will be found to exist in many localities. It is of course true that the chances for recovery of some patients suffering with acute pyogenic conditions would be considerably lessened by a delay of even a few hours. In the majority of cases, however, this delay would not be a detrimental factor.

It does not take long to carry out some of these tests and even in the acute cases one or two of these blood chemical determinations may assist the surgeon in deciding whether or not it might be advisable to do the operation in two stages rather than to attempt to complete it at one time. It is more satisfactory to have a living patient than to have performed a successful and brilliant operation.

Hypertrophied prostates and other mechanical chronic obstructions to the outflow of the urine have been found to show a low kidney function with its accompanying high retention of non-protein nitrogenous elements in the blood. This condition is best determined by the chemical examination of the blood. It is now quite the routine to make a 2 stage operation of these cases. The blood chemistry will assist the surgeon in deciding what time is the most favorable for the second operation, the time that will be the safest for the patient. The value of such pre-operative studies is shown by an investigation by Thomas in which he found that the mortality from nephrectomy and prostatectomy in the hands of the general surgeon is 25.9-22.5% respectively as compared with 7.7-4.3% in seven times the number of similar cases operated upon by 8 of the best urologists who make these studies. Wold draws the conclusion that in the great majority of such cases 70-80% of the deaths are avoidable if the kidney function is ascertained before operation and when found deficient proper pre-operative treatment given.

When we reach the stage in the progress of surgery where all surgeons carefully work out the surgical risk of every case by

accurate clinical and laboratory methods before operation, we shall have reached what Frank has aptly termed "an epoch of physiological surgery."

CONCLUSIONS

(1) The glucose tolerance test has been shown to be of considerable assistance in establishing the diagnosis of cancer, especially of gastro-intestinal carcinoma when the other conditions that give a similar blood sugar curve have been eliminated.

(2) Ether should not be the anesthetic of choice when the patient is found to show an acidosis by a low carbon dioxid combining power of his blood plasma, or some other of the accepted methods.

(3) In gastro-intestinal cases showing a starvation acidosis a 2-stage operation may well be considered.

(4) A poorly functioning organ is to be feared more as a factor bearing on the operative risk of the patient than a diseased organ that is doing its work satisfactorily.

(5) Many deficient metabolic processes of the body may ultimately affect the functional ability of the kidneys.

(6) No one test for kidney function should be used to the exclusion of all others.

(7) Blood chemical tests, like all other laboratory procedures, must be considered only as additional clinical evidence and their value determined by weighing them with all the data available.

(8) A P-S-P output of over 75% in 2 hours may be a sign of lessened kidney function.

(9) A low P-S-P result is not always an indication of a serious kidney impairment, especially when the blood retention products are not found to be excessively high.

(10) A high blood urea content is probably always an indication of lessened kidney function regardless of the results of the other tests.

(11) Satisfactory results cannot be expected from these tests if their performance be left to some one not thoroughly conversant with the chemical procedures involved.

(12) The estimation of blood creatinin is the most valuable prognostic sign we have in cases of renal deficiency.

(13) The slight delay caused by these pre-operative studies of the patient would not be a detrimental factor in lessening the patient's chances for recovery in the majority of operative cases.

(14) Blood chemistry is of special value in cases of hypertrophied prostate and other mechanical chronic obstruction to the out-flow of urine.

(15) We should strive to attain that ideal, when every operative patient will be carefully studied by clinical and laboratory methods to accurately ascertain his "surgical risk" before operation, as then that epoch of "physiological surgery" will become an established fact.

DISCUSSION

Dr. S. F. Hoge, Little Rock, Ark.—The influence of chemical features in these studies has directed the attention of the investigator, to the blood, exudates and transudates. It is not easy to draw definite conclusions from these studies because when you mention the word chemistry you are confronted with the field of biological chemistry, colloid chemistry, organic and inorganic chemistry, physiologic chemistry, etc. Each one of these divisions presents a great mass of facts difficult to correlate.

In studying the chemistry of the blood the approach may be made either directly or indirectly. Under direct blood chemistry we should include those tests which the essayist has named, especially emphasizing the creatin and creatinin tests, the details of which he left out. In the indirect studies we include the alveolar air tension, especially in nephritis and uremia, and the metabolic study in thyroid conditions. These studies are recent and are opening up broad fields of usefulness which when completed and systematized and simplified will certainly prove of value to the surgeon and internist in their clinical interpretation of diseased conditions.

Dr. Bailey (closing).—I wish to add, along the line of checking these various tests with the other clinical data which is available, that we had one case in which the trouble was a pus kidney of one side. The blood chemistry test showed that the non-protein nitrogen was 72, which is about twice the normal, and the urea nitrogen was well above the normal. If we had judged that case entirely by the blood chemistry test we should have prophesied a rather stormy convalescence, but the patient went through the operation without much difficulty.

One case of carcinoma of the cervix which we had showed an increase of the percentage of blood sugar, running up to around 200 mg. per 100 c.c., while a high normal is 120. In those cases you often get the increased blood sugar as well as in carcinoma of the gastro-intestinal tract.

CONGENITAL HYDRONEPHROSIS*

BY A. I. FOLSOM, A.B., M.D.,
Dallas, Texas.

The two cases which form the basis for this paper have seemed to me to be of sufficient interest to justify my reporting them in some detail and calling attention to some of their points of likeness and unlikeness. I shall not go into an academic discussion of the general subject, nor shall I attempt even to enumerate the causes of this condition, which truly may be legion.

My purpose in reporting them is first, to call attention to the fact that these conditions can and should be diagnosed by our modern urologic methods. An early, accurate diagnosis will be the means of saving many kidneys to these children in whom, if they were allowed to run merrily along, the kidney would be destroyed before they had reached early adult life.

One of these cases was seen by a very good urologist of the Middle West, who advised against any cystoscopic efforts whatever being made. This advice if followed would, I believe, have led to the ultimate destruction of the kidney, whereas, the child has now been accurately diagnosed and operated upon and is apparently well. His kidney has been saved from further destruction.

Case 1.—Boy, age 7 years. Family history, negative. At the age of two years the patient began to have attacks of very severe abdominal pain, indefinitely located at first, which gradually appeared to be in the left loin. These attacks were extremely severe and at frequent intervals. At the age of three years there began to appear a mass in the left loin, which came with the onset of pain and disappeared with its termination. At the age of six years he began to have fever with attacks of pain, and finally in one very severe attack which lasted longer than usual, the boy was operated upon and a nephrostomy performed. A large quantity of pus and urine were evacuated and his improvement began at once.

After draining the kidney for a short time the tube was removed. As the sinus closed up the pain in the loin returned with such severity that reopening the nephrostomy wound became necessary. At frequent intervals it was closed again, but it always precipitated the pain. At the age of seven years he presented himself to me, after having worn a tube in the nephrostomy wound for about one year.

The general physical condition of the boy was good. Well developed and apparently well otherwise.

The question of course was, could the hydronephrotic left kidney be removed as there seemed no hope for any other solution of the problem.

Cystoscopy was done under general anesthesia. First of all we encountered two congenital narrowings in the bulbous urethra, which had to be incised by an Otis urethrotome.

The general bladder surface was only moderately inflamed and both ureteral openings were easily seen, and stood fairly well open.

A No. 5 ureteral catheter was introduced into the left ureter. Just outside the bladder wall an obstruction was encountered. When this was finally passed, the catheter went up to the uretero-pelvic junction where an impassable obstruction was met. Beyond this I could never get a catheter, and no urine at all was collected through this catheter.

To my surprise, on catheterizing the right ureter, I found an obstruction just outside the bladder wall, another near the uretero-pelvic junction, and a residual urine of some 200 c. c.

Pyelogram of the right kidney showed a very large hydro-nephrosis, and a ureter with multiple sacculations. Phenolsulphonephthalein test showed an appearance time of 5 minutes from the nephrostomized kidney and of 10 minutes from the supposedly good kidney, which excreted about 10% in the first 20 minutes. The right showed approximately half that quantity in the same time.

Urine from the right kidney showed pus and colon bacilli, with a specific gravity of about 1010.

Repeated search for tubercle bacilli was negative. The child was otherwise well and in view of the entire absence of any bladder irritation, I feel that we can exclude tuberculosis as an etiological factor.

We repeatedly irrigated the right kidney pelvis in an effort to improve its function, and meantime gradually stretched the ureteral strictures until a No. 7 F. catheter could be passed to the pelvis of the right kidney.

The boy's life was a burden to himself and his mother, and I finally advised an operation to attempt to re-establish the communication between the left kidney pelvis and the ureter. I felt that a failure would not make matters any worse, while a success would relieve him of the constant contact with a big urine soaked pad.

In November, 1920, operation was done, at which time an extraperitoneal exposure of the kidney and ureter was made. The incision was made below and independent of the existing nephrostomy wound, because there seemed to be a valve-like arrangement of the old wound which favored closing, which would be of advantage to us in the convalescence if we succeeded in re-establishing the channel.

The kidney cortex was found to be in fairly normal condition, save that it was about one-half the normal thickness. Its color was good.

The large pelvis was easily found and isolated and led to a funnel-shaped point where the ureter began. There were no adventitious blood vessels

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present, and the ureter was not twisted. In fact, no extraneous cause could be found for the obstruction. The junction was slightly thickened, but not enlarged. The ureter below this point was slightly dilated, but not indurated.

A longitudinal incision was made, beginning above the uretero-pelvic union and running longitudinally along the union to meet the upper end of the ureter. The lumen of the ureter at the point of union was smaller than normal and the wall was thickened. It was my conviction at the time that we were dealing with an organic narrowing of the ureter.

The incision was closed transversely to the ureter by interrupted Lembert's sutures of chromic catgut. A No. 6 ureteral catheter was left in the ureter, extending through the union.

The tube in the original nephrostomy wound was left in place and a small cigarette drain carried down to the incision in the ureter.

Convalescence was uneventful until on the tenth day cystoscopy was done. A No. 5 F. ureteral catheter was introduced into the left ureter. We found the same obstruction near the bladder, but at the uretero-pelvic junction there was no obstruction felt at all. The catheter passed readily by the site of operation and into the kidney pelvis. A continuous flow of urine was obtained.

Following cystoscopy, he had rather a severe reaction and for two days had a decidedly diminished urinary output, with every evidence of a beginning uremia. This was fleeting and in four or five days he was again on his road to recovery.

There was some drainage for about six weeks following the cystoscopy, during which time I passed the No. 5 catheter through the obstruction in the lower end of the left ureter, for it was evident that this was the only point of obstruction remaining.

Two months from date of operation the sinus was closed entirely and has not reopened. He is entirely comfortable, is growing, and seems to be in good health and spirits.

Case 2.—Tom C., age 6 years. At the age of two he began to have attacks of pain in the left side of the abdomen. At times this was very severe and on occasions morphin hypodermically had to be administered. There soon began to appear a mass in the left loin synchronous with the appearance of the pain, which would disappear with the passing of the pain. During these attacks he was nauseated quite frequently. There was no urinary disturbance and no blood was seen in the urine.

He was first seen in an attack. The mass was easily palpable, and could be readily seen on inspection. It was quite tender and fluctuation could easily be made out.

Cystoscopy was done under general anesthesia and again an obstruction was found in the bulbous urethra. This was incised with an Otis urethrotome. Bladder surface was normal. Both ureteral openings were seen and appeared normal save that the left one seemed to be more relaxed than the right. Catheter entered the left ureter and passed readily up to the uretero-pelvic junction and on into the pelvis of the kidney, after meeting only a small amount of obstruction. A residual urine of 80 c. c. was withdrawn, but it was clear and apparently normal.

A pyelogram was made, which showed a large hydronephrosis involving in a large measure the pelvis and only to a minimal degree the calices.

Subsequent to the cystoscopy the boy went for a few months without an attack. In an attack he again presented himself and cystoscopy was done under local anesthesia in the office, draining off about 120 c. c. This relieved him immediately and completely. Following this on several occasions, ureteral catheterization was done for relief of the attack of pain.

Case 1.—Pyeogram of left kidney.

We finally advised an operation, stating that in view of the fact that almost all of the dilation seemed to be at the expense of the pelvis, and only slightly at the expense of the calices, an anastomosis could probably be done between the dilated pelvis and the ureter, and thus save the kidney. But we stated that at operation it might appear best to remove the kidney entirely.

Following this advice they went to the Mayo Clinic where the boy was operated upon by Dr. Judd. An anastomosis was made and the boy is now apparently well.

One of the very interesting things in connection with this report is that in Case No. 1 there existed a very severe grade of hydronephrosis in the right side where no pain had ever been experienced.

This might at first seem to argue for Braasch's theory of inflammatory dilatation. Yet we do have on this side very definite obstruction as is shown not only

by the catheter during passage to the kidney, but the ureterogram also shows a moderate degree of dilatation with at least two areas of narrowing. It seems to me rather to show that we can have a sufficient degree of obstruction to produce the dilatation and yet not enough to give the classical pain by reason of a temporary complete closure.

The second fact of interest is that in one case the dilatation practically altogether occurred at the expense of the kidney substance (Case No. 1), the calices being immensely distended and the cortex of course correspondingly thinned, whereas, in Case No. 2, the substance of the kidney had not been seriously encroached upon at all. The pelvis was widely dilated, a point worthy of careful consideration in estimating the prognosis and proposed care.

The third point I desire to emphasize is that boys of this age can be cystoscoped satisfactorily and all the modern urologic methods used in these cases to arrive at a correct diagnosis. Both of these boys were cystoscoped repeatedly in my office under local anesthesia, although for the original sitting I employed general.

I am very firmly convinced that we are neglecting this important field and it is already time for us to begin to make amends for our former lack of interest in these little fellows who may happen to have some serious urological lesion.

DISCUSSION

Dr. George R. Livermore, Memphis, Tenn.—I have seen only one case of congenital hydronephrosis, and that was due to an abnormal insertion of the ureter in the bladder.

Dr. Abraham Nelken, New Orleans, La.—I took the liberty of bringing some pictures to the meeting to show you in connection with this paper. The patient had some difficulty in passing urine through the urethra and had some residuum. Under dilatation of the urethra the condition has improved greatly and the urine has become very much clearer. A point of interest in the picture is the bladder, which is shown somewhat to the right. On physical examination, before the cavity empties, it is easy to find a mass in the left side, and you can see here (indicating) the dilated ureter and the dilated pelvis of the left kidney.

An interesting point is that this picture is not taken after cystoscopy. It is simply a cystogram and we have here (indicating) a filling with the bromid solution giving us an excellent picture of the posterior urethra, bladder, left ureter and pelvis of the left kidney.

Dr. W. A. Frontz, Baltimore, Md.—I was particularly interested in Dr. Folsom's explanation of, the etiology of these cases of hydronephrosis, as he brings out a point made by Dr. Geraghty and me some years ago. In a series of cases we found that where the dilatation ended abruptly at the junction of the pelvis and ureter, in practically all cases we were able to demonstrate at this point a definite chronic inflammatory change, characterized by the presence of round celled infiltration and more or less fibrosis. In regard to the role played by aberrant blood vessels in these cases of obstruction, we were inclined to the opinion that it was more often a matter of effect than cause; i. e., with the development of the hydronephrosis and consequent descensus of the kidney, if a blood vessel were so situated that it came to occupy a position in close relationship to the uretero-pelvic junction, it might then be productive of a certain obstruction. In such a case, however, it would play a secondary role in the production of the obstruction. In our series this relation has been noted, but in all of them the contracture of the uretero-pelvic junction was present.

Dr. Folsom (closing).—I should have said in connection with the first case that repeated efforts to convict the boy of tuberculosis of the genito-urinary tract were futile. He had no bladder irritation which goes with it and I feel reasonably safe in saying that the boy did not have a tuberculous obstruction.

These cases have been found to exist in children only two or three months old. Sometimes just after birth these congenital hydronephroses have existed and when found the tissues have shown undoubted evidence of inflammatory thickening of the ureter.

As to the question of the blood vessels, I think there is probably some reason to question the conclusions of Geraghty and Frontz in that they attribute the ultimate results altogether to the mechanical descent of the kidney. I feel that it would be just as reasonable to believe that the vessel were the original offender and by reason of the kidney's gradual increase in weight the thing was made more definite. I have the specimen from one case, which shows beautifully the effect of the vessel going into the lower pole of the kidney, where it shows a kink in the ureter, which argues for Dr. Frontz's view rather than the other.

THE CORRELATION OF X-RAY INTERPRETATIONS, WITH CLINICAL FINDINGS AND END RESULTS IN RAILWAY SURGERY*

By E. T. Newell, M.D.,
Chattanooga, Tenn.

There is an ever-increasing tendency at the present time to x-ray all pathological conditions that will show on a radiographic film. In addition, the roentgenologist is increasing the field of fluoroscopy, both in its scope and usefulness.

The subject of this paper is limited to fractures, a subject that every man doing railway surgery comes in contact with constantly. The surgeon frequently fails to recognize and diagnose many fractures unless he x-rays all possible, rather than all probable, fractures.

In the discussion of the subject to follow, it is assumed that the fractures in question have been x-rayed before any attempts at approximation were made and that radiograms were taken immediately following the setting or adjustment of the broken bones; that the adjustment may or may not have been done under the fluoroscope, or with the aid of the fluoroscope, and that a general anesthetic was used.

The slides that I shall show you later represent work that was done with the above technic, save that the fluoroscope was not used in all the cases. The use of the fluoroscope in checking the results immediately following attempts at reduction, I find to be of distinct advantage. It enables one to make much better x-ray apposition. However, it is of great importance to have several plates made following the approximation, for one gets better detail on them and can study them at length.

I believe the surgeon doing the work should use the fluoroscope rather than the roentgenologist, though the latter may be of great assistance and make valuable suggestions with regard to prognosis, etc.

In this work the use of the Hawley table in setting fractures of long bones in adults is of great assistance, for reasons too obvious to mention.

Having assumed that you have set a particular fracture, say of the lower third of tibia and fibula, under the fluoroscope, to your satisfaction, and that the radiograms taken later show the fragments approximated perfectly, or nearly so, I wish to emphasize the point that you will not necessarily have a perfect result, or one that will be satisfactory to patient or surgeon. On the other hand, if the fluoroscopic examination is not all you desire, and the plates show only a partial approximation of the proximal and distal fragments, you may still obtain a perfect functional result with little or no deformity. Baetjer, Johns Hopkins Hospital, in his latest text book has the following to say: "The shaft of a long bone may not be perfectly reduced, yet the functional and cosmetic result will be good."

This, then, would indicate that the x-ray was unreliable, unsatisfactory and not dependable in the setting of fractures. However, this is not the whole truth. A fracture must be adjusted from two standpoints to get the best results: from the x-ray and the clinical. By the clinical, I mean the alignment of the fragments must be good. After you have obtained the best x-ray approximation that you can, you should see to the correct alignment of the limb. This is of paramount importance and of equal, if not greater, importance than correct approximation of bony fragments. While I do not wish to depreciate in the least the value of x-rays in fracture work, I do wish to point out that it has its limitations. The x-ray has its greatest usefulness in diagnosis, being almost one hundred per cent in point of service. It not only makes the diagnosis positive in doubtful cases, but in positive cases it details the extent and position of the fracture and indicates what should be done.

*Read before the Southern States Association of Railway Surgeons, Auxiliary of the Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

The fluoroscope further assists in the actual approximation and the follow-up plates show what has been accomplished, as far as approximation goes.

It is here that great danger lies in correctly interpreting these plates to ascertain whether the fracture should be let alone or further attempts at better approximation be made. The roentgenologist often only sees the plate, sees a 50 or 60 per cent approximation, often less, and writes his findings: "Fragments only partially approximated, fragments widely separated, fragments greatly overlapping," etc. He probably has never seen the limb or extremities, his assistant or technician making the exposure with or without removal of splints, bandages, etc.

Such a report may completely mislead the operating surgeon with regard to what is best to do and what his end results will be. It is true that the roentgenologist is interpreting the plate in a purely technical manner as he sees it, but if he had seen the limb in perfect alignment, with no perceptible deformity, he probably would not have used such phrases as "only partially approximated," "widely separated," "great overlapping," etc. Dr. Hirsch, X-Ray Department of Belleview Hospital, New York City, lays special stress upon this point when making his interpretations. The radiograms are only shadows at best and so many factors enter into their correct interpretation that those interpreting them should be very specific. They should specify the deformity in inches, centimeters or percentage of displacement. The roentgenologist should take into consideration all the facts and render conservative reports rather than alarming ones (alarming to both patient and doctor).

Dr. Hawley, *Journal of Orthopedic Surgery*, October, 1921, speaking of the treatment of fractures, says, first, that "restoration of function is more important than restoration of form." Second, "the treatment of fracture is the treatment of disability, not deformity."

We shall have accomplished a great deal in correlating x-ray interpretations and clinical findings if we bear these two statements in mind in treating fractures and remember that it is not always necessary to have a one hundred per cent x-ray end-to-end approximation, provided you have good alignment, to obtain good functional results and cosmetic effects. After all, this can only be proven by the end results obtained in many cases of all kinds and varieties of fractures in which the above conditions have prevailed.

The writer does not wish to be construed that it should not be the endeavor of every surgeon to approximate accurately and definitely every fracture when it is possible and feasible, but it is frequently impossible to do this without an open operation.

The slides that I shall now show represent a few cases of incomplete approximation with correct alignment, giving satisfactory results both as to function and cosmetic effects.

These few cases were not specially selected, but were picked out at random from the fracture cases treated at our Clinic during the last two years. They should illustrate, better than I could express to you, the cardinal point in this paper: the necessity of correct interpretation of radiograms, and correct interpretations of clinical findings.

DISCUSSION

Dr. Chas. H. McCollum, Fort Worth, Tex.—Some of the greatest mistakes I have made in the diagnosis of these cases have been in relying upon the fluoroscope in children. It does not show very clearly and in a great many instances we completely overlook a fracture that involves a joint, more particularly if that joint is in the phalanges. The reason the fluoroscope does not demonstrate it well is on account of the lack of hardness of the bone. In every case where there is the least suspicion of a fracture there should be a picture in at least two positions, and in three if you can get it. Recently I demonstrated a fracture of one of the bones of the foot that had been overlooked for some two or three months by simply taking two views. The fracture was only in part and in such a position that neither an antero-posterior nor lateral view demonstrated it. It resulted in a suit that could have been easily prevented if the roentgenologist had taken the precaution to observe that point.

Dr. Walter E. Vest, Huntington, W. Va.—The surgeon should translate the x-ray rather than the roentgenologist. This point made by Dr. Newell is one of the most important points, which I have been stressing for years. Differ-

entiate between disability and deformity. Before the x-ray we knew nothing of deformity unless it was so marked that we could see it. As I said to a juror, I would rather walk on a crooked shin (?) than walk straight with my weight upon a stick. They do not appreciate that.

I have seen fractures at an angle of fifteen degrees where a man had better functional results, where there was better alignment, because there was no complication of joint injuries. Yet I remember one case of that kind where the jury gave three thousand dollars for a crooked leg and five hundred dollars for a defective knee because the x-ray did not show it. Wolfe's law states that in the course of time all these deformities are corrected almost to perfection, that at the time of fracture enough callus is thrown out to correct that deformity, but only as much of the callus as is necessary to make a perfect limb remains, the balance being absorbed. We used to see more cases with enormous calluses before the x-ray because we did not get exact alignment and had more of the periosteum taken off. But the enormous callus which may be seen at first will in a year or two be a deformity too small to be recognized.

If you can get the ends to overlap, even if only 5 or 10 per cent, to prevent overriding of the bones which gives the greatest deformity with shortening, it is not necessary to get perfect alignment. If you can prevent the shortening it does not make any difference whether you have good apposition or not. You get the same results in the end. We have a number of skiagraphs which show these conditions.

If you are not able to interpret your own skiagraphs you will have trouble. Very often the roentgenologist will tell the patient, "This is a bad result." My friend, Dr. Pearcy, a couple of years ago, had an impacted Colle's fracture. It was reduced with difficulty. The radiograph looked very bad. The roentgenologist told the Doctor that he would have a very bad result. He would not have supination and pronation. Today, you can scarcely tell anything had ever happened to the wrist at all.

We see cases of that kind all the time. Do not depend upon your roentgenologist. Do not depend on the x-ray for functional results. It is all right for cosmetic results. As to the open method, remember the fewer the better. We used to do many of them, but today we are doing less because we are using traction instead of putting on a splint which does not hold them in apposition and does not prevent overlapping.

Dr. T. H. Hancock, Atlanta, Ga.—I stopped putting in plates ten years ago. Every plate is coming out. If you put in a wire it will stay indefinitely. I have had some which stayed in as long as twenty-five years. Do not use silver or steel wire. Use malleable wire. The silver is not strong enough and you cannot twist the ends of the steel wire. Use malleable wire from the hardware store; you can bend it and twist the ends. I am going to have some of it silver-plated. It is possible the tissues may tolerate this better. By drilling holes in the bones you can wire them in any position you want, and it will stay in there until the last day.

Dr. J. A. Orr, Paris, Ky.—I have had four cases recently of railroad injuries, fractures of the metatarsal bone. One case was recently brought in. It looked as if something fell on the foot. There was only slight contusion and some swelling. It was impossible to elicit any crepitus. My first impulse was to ask why they rushed the man into the hospital before any one had seen him. The x-ray picture showed a fracture of three metatarsal bones. I wish to emphasize the necessity of having x-ray plates made of injuries of the foot.

Dr. E. D. Martin, New Orleans, La.—Whenever you have a fracture of the metatarsal bone, you can elicit pain by lifting the toe of that particular bone. We have been able to demonstrate that in many cases. It procures pain in the toe almost at once. One of my assistants has been able to demonstrate that so often that it is very well worth remembering.

Dr. Vest.—We have been able to elicit the same thing by pressure on the end of the nail.

Dr. Newell (closing).—I wished to show you some of the worst cases. I could have brought slides where I obtained beautiful approximation by the use of the Hawley table under fluoroscope. We have cases where results from the x-ray standpoint are not good. Still we can work our way out, and must not become panicky about what the roentgenologist tells us the radiogram shows. So long as we have good alignment and, as Dr. Martin said, have some approximation so that there is no overriding, the results will be good. We can not get 100 per cent in every case.

Unless you x-ray cases of fractures of the foot you cannot tell about them. Many cases come in and say "Bandage up my arm; it is not broken, I know." You do not know whether it is fractured or not. It does not look as if it were. You x-ray it and find not only a simple fracture, but one in which there is overriding. The patient insists there is no fracture, because he did not fall ten feet or have some heavy weight fall on him. The bone is more or less elastic and if he falls on the bone with the muscles taut, you get a fracture. You do not need a heavy weight or great distance to produce a fracture. If he is relaxed and falls a considerable distance he will not get a fracture. When you are in doubt be reasonably sure these cases should be x-rayed. You will find fractures when you least expect them.

The tender point holds good not only in the metatarsal bones, but in others, and I wish to say to you men who have not an x-ray, if you have a doubtful case, if you have pressed all up and down over the bone, especially the more superficial bones, you will find at the line of fracture nearly every time a tender point. When touched at the point where there is a fracture the patient jumps. That is a very important point. I am very glad this was brought out in discussion. It holds good for fractures of long bones as well as the metatarsals. It is one of

the best ways to bring out a doubtful fracture where you have no radiograms.

Traction is of great help. The fluoroscope is also a great help in getting better results.

I do not think anybody is putting in plates now, not even Lane is putting them in as he used to. Henderson uses bone plate, I do not know with what results, but I know I can not get the results he claims he is getting. The wire may be good. I have used heavy copper wire and did not seem to have any trouble from it, but I believe in most cases with heavy kangaroo tandon you will get the same results as with wire. Doubled No. 4, forty-day chromic catgut, in these fractures, will hold long enough for union to take place. I have used it in a great many operations where the condyles were torn off. I would not use it in a femur case. I do not believe it would hold it.

The Martin band is very good in oblique fractures. Still you have metal in there—your hardware.

I hope I have succeeded in just this one point: of getting together the x-ray interpretation and the clinical findings; getting on some practical basis where the x-ray man's interpretation will coincide with the clinical findings, so that the two can be correlated and we can have a satisfactory ground upon which we can rest our cases. Do not tear down good work and do an open operation just because the interpretation of the plates and your interpretation as a surgeon do not harmonize. We must have a good sound basis on which to work and know we can get practically as good results as we should have had had we had a 100 per cent approximation.

Dr. W. W. Harper, Selma, Ala.—I wish to say a word about something that was not brought out in the paper, but in the discussion. That is this: we see frequently an epiphyseal separation in children. It is like taking a crowbar and prying up a big rock. Remove the crowbar, the rock settles back, and you cannot tell that it has been prized up at all. The x-ray even may show nothing. We make the diagnosis on three points alone: loss of function, history, and bony encircling tenderness. What I mean by history is history of immediate loss of function. It is a point brought out by Dr. Stone, Chief Surgeon of the Children's Hospital in Boston. A child stumbles and falls, gets up and runs around perhaps all the rest of the afternoon. Next morning he cannot use the leg. You know that child has had no epiphyseal separation. But suppose the history said that the child stumbled and fell and from that moment could not use the leg. You know you have an epiphyseal separation and you treat it as such.

That is important, because if it is not recognized you are likely to set up inflammation along the epiphyseal lines, that patient's leg or arm ceases to grow and you have a child with a permanent deformity. But with that history a loss of function from the very moment of the fall, and with bony encircling tenderness, you know you have an epiphyseal separation.

Dr. Newell.—There are so many points about fractures that it is impossible to cover them all. Dr. Harper's is well taken. And in that connection we have authentic cases where people have claimed to have a fractured femur or fractured radius, etc., of recent origin. On x-ray examination you find that there is a lot of callus formation. They claim the injury occurred only two or three days before, but the callus shows it occurred two or three weeks or months before. The x-ray is inefficient in some cases, as Dr. Harper said. It may show nothing in the first few days. Just as in acute osteomyelitis, the x-ray is worthless the first ten days. It gives no information in epiphyseal separation where there is no displacement. But it does give valuable information, especially in railway work. When a man claims to have a fracture and submits to an x-ray examination, a competent roentgenologist can tell approximately how long it occurred before the picture was taken.

EYE, EAR, NOSE AND THROAT

MALARIA AND EYE, NOSE AND THROAT INFECTIONS

By Harvey B. Searcy, M.D.,
Tuscaloosa, Ala.

Recently it has again been impressed upon the writer that "no one is sufficient unto himself" and that he has been getting narrow in his limited field of medicine and has failed to take advantage of the assistance he could have obtained from the laboratory by the more frequent examination of blood smears.

Malaria lies latent in many people, in the author's section of the country, and lowers their resistance to local infections. Unless the malaria is also recognized and treated, the local infection in the eye, nasal sinuses, etc., will certainly not improve as it should from the treatment of the local condition alone.

In October and November, 1921, many blood smears were sent to the City Health Laboratory for examination, and it was indeed surprising how common the report, "Positive for malaria," was returned, and how rapidly the local condition in the nose or throat improved after starting the administration of quinin.

Below are the condensed reports of 18 cases reported by the Laboratory as being "Positive for malaria," which had, in addition to the treatment of the local condition, the treatment for malaria.

The purpose of this incomplete paper is to show how frequently and how unsuspectingly malaria does complicate local conditions in the eye, nose and throat.

The standard treatment for malaria recommended by the National Malaria Committee and approved by the United States Public Health Service was used.

These cases were referred by general practitioners because of definite symptoms pointing to local infections in the eye, nose or throat. There were still other cases that improved after the quinin administration was started, but the malarial organism could not be demonstrated in the blood smears. The type of malarial plasmodium was not stated in any of the reports, as it was not insisted upon, for there was then no thought of reporting the series.

CASE REPORTS

Case No. 1.—T. J. C., age 20, came on October 6, 1921. He had had acute coryza three weeks previously. Left frontal pain had been present for two weeks; worse in the mornings. When first seen the pain was constant, was aggravated by leaning forward, and there was tenderness on pressure. The left nostril was rarely open enough to breathe through and there was considerable discharge.

Examination showed much pus coming from beneath the anterior end of the left middle turbinate after using cocain and adrenalin and negative pressure. Temperature was 99°.

October 7, report from the Laboratory said "Positive for malaria." Quinin was started. Local treatments to the nose were given on October 8, 10, 11 and 13. No pain or tenderness and only slight discharge at times.

November 25, 1921, there was no apparent sign of any recent infection. Quinin was continued as specified by the standard treatment mentioned above.

Case No. 2.—J. McQ., age 15, was first seen on November 13, 1921. Severe pain was complained of in the right frontal region. It was only slight the previous morning. He had had a cold for about a week.

Examination showed pus coming from beneath the anterior end of the right middle turbinate after cocain and adrenalin application.

November 14 blood smears were reported "Positive for malaria." Quinin was begun. Local treatment instituted.

November 16 there was no pain. Quinin was continued, but no further local treatment was necessary. No recurrence of pain took place.

Case No. 3.—C. C. J., age 27, presented himself November 2, 1921. He had had his nose broken in 1918, and since that time had had recurrent attacks of frontal sinusitis. He had had two operations, intranasal, for relief of the condition.

Examination showed scar tissue, septum, from an old operation. The septum was deflected to the left, crowding the left middle turbinate. Much pus was seen beneath the middle turbinate on the left after the use of cocain, adrenalin and negative pressure.

Local treatment relieved the acute pain. Blood smears were reported "Positive for malaria," and quinin was begun as above.

Local treatments were given on November 3, 4, and 5. No pus was then found in the nose.

November 7 the nose was apparently well. Advised operation to relieve the crowded condition.

Case No. 4.—D. J., age 28, on November 25, 1921, complained of a severe frontal pain of

three days' duration, more severe that morning than before. Had been in bed for two days.

Frontal sinusitis was acute. Blood was positive for malaria.

Local treatment and quinin were begun.

November 26 pain was not so severe.

November 28 he returned to work as a taxi driver. Quinin was continued.

Case No. 5.—Mrs. A. M. G., age 47, seen on November 4, 1921, complained of pain which had been present in the right frontal region for eight weeks, but which was then getting in the left side at times.

The right frontal sinus region was tender and there was slight edema of the skin. Transillumination showed the right side (antrum and frontal regions) darker than the left. Right middle turbinate was swollen and tight. Very little shrinkage followed the application of cocain and adrenalin. Much pus was found beneath the right middle turbinate.

From the right antrum was washed out a small amount of fluid pus. The blood was positive for malaria.

All local treatments were refused by the patient. A letter to her home physician advised quinin. A report from her doctor states that there is relief of pain, but still some discharge from the nose.

Case No. 6.—A young man, age 18, came on November 15, 1921, with pains in the right frontal region which had been present for several days, more severe in the mornings. He had had a similar attack two weeks previously that was not so severe.

Examination revealed a temperature of 99.5 degrees. Frontal region was tender. Right nose was congested, with pus beneath the right middle turbinate. Blood was positive for malaria. Quinin was prescribed.

November 19, 1921, he telephoned that he had had no more trouble and that his nose was clear. He was advised to continue with the quinin.

Case No. 7.—Miss V. F., age 16, was seen on October 24, 1921. She gave a history of having been treated for malaria during the previous summer. No quinin had been taken for about a month. A severe cold started three weeks previously, but for about one week had been limited to the left side, and she had had severe pains in the left forehead, worse in the mornings and on leaning forward. She had been taking treatment for the cold, but the pain was getting worse.

Examination showed that the left middle turbinate was very large and crowded against the lateral wall and septum. The tip was cherry-red and the entire mucous membrane was edematous. A considerable amount of creamy pus escaped from beneath the middle turbinate.

The pain was relieved considerably by local treatment and suction. Treated October 25, 27, 29, November 1 and 3. The condition was changed but little and the pains seemed worse every other day. Blood smears were taken and reported and were positive for malaria. Malaria had not been found on previous examinations. Quinin was started. Treated November 7. No pain remained and the discharge was much less. November 10, about well.

November 15, no signs of previous infection on examination.

Case No. 8.—Mrs. A. M. P., age 40. Previously I had removed the right middle turbinate, curetted the anterior ethmoids and opened the antrum. I had treated her on many occasions since that time. November 16, 1921, I persuaded her to let me remove the left middle turbinate and open some ethmoid cells. November 16 blood was reported positive for malaria, and quinin was started. December 2 the nose was healed nicely and her general health was greatly improved.

Case No. 9.—Mrs. J. A. O., age 45, consulted me on November 28, 1921. In June, 1912, I had opened the right antrum because of a chronic empyema. She had had no more trouble since that time till recently. She complained of a "neuralgia" of the right side of the face and a severe cold for about ten days.

The right antrum was washed through the old opening of the 1912 operation and a small lump of muco-pus was obtained. Blood examination was positive for malaria. Quinin was begun November 30, 1921; the "neuralgia" had stopped, and her condition was greatly improved. Quinin was continued.

Case No. 10.—J. T. M., age 44, came in October 27, 1921, with a history of having had several operations in the right nose. He complained of severe pains in and around the right eye.

Examination showed that the anterior half of the right middle turbinate was absent. Many small polypi crowded the upper portion of the right nose and a large spur of the septum pressed against the posterior remnant of the middle turbinate. Considerable muco-pus was seen in that portion of the nose.

The polypi were removed. Blood proved positive for malaria. Quinin was begun. Treated October 28 and breathing became freer and the pain stopped. Advised removal of the spur and opening the ethmoids. November 10, treated.

Case No. 11.—J. P., colored, age 17, was seen on September 15, 1921. He had hyperesthetic rhinitis and it had recurred every fall for several years.

Blood was positive for malaria.

No local treatment was given. November 7, 1921, there was free breathing room and no discomfort. The general health was better.

Case No. 12.—W. E., age 43, consulted me on November 14, 1921. There had been an acute antrum infection of the right side in 1914 and the left had been infected in 1917. He complained of pains across the bridge of the nose and general malaise.

Blood was positive for malaria. Quinin was prescribed.

Case No. 13.—Mrs. McG., age 22, was seen on November 14, 1921. Her adenoids and tonsils had been removed in 1914. The anterior ends of both middle turbinates were removed in 1919. Complaint was that both nostrils became stopped up at night. There seemed to be no discomfort during the day.

Examination showed that both passages were free. The blood was positive for malaria. Quinin

was prescribed. Entire relief of discomfort followed.

Case No. 14.—Miss D. came on December 2, 1921. She gave a history of having had a tonsillectomy. The right middle turbinate at its anterior end had been operated upon. The left ethmoids and sphenoids had been opened. Increasing deafness was noted. Her complaint was a feeling of tightness in the nose and a slight postnasal discharge.

The nose appeared free and clear. The blood was positive for malaria.

Case No. 15.—Miss B. presented herself July, 1921. She had some discomfort in reading and was refracted. October 24, 1921, there was a recurrence of an old corneal ulcer. The blood was positive for malaria. Local treatments were given and quinin was begun.

Case No. 16.—Miss L. D., age 12, consulted me on March, 1921. She was refracted and prescribed +1.00 for both eyes.

November 18, 1921, headaches and frequent sore throat were complained of. Glasses were found satisfactory.

The throat showed general redness. The tonsils were small and there was pus. The adenoids were very small. The blood was positive for malaria. She was advised to take quinin. About one week later she was taken sick and was treated for the malaria.

Case No. 17.—N. A., age 10, on October 8, 1921, came to see me. He had a marginal ulcer. Local treatment consisted of atropin, etc. The blood was positive for malaria and quinin was begun.

Case No. 18.—H., age 12, on October 6, 1921, was sent home from school because of being unable to study. He had had considerable headaches while in school for several weeks. He was refracted and accepted +0.25 for each eye. Vision was 20/15. The blood was positive for malaria. Quinin was begun.

A NEW TREATMENT FOR HAY-FEVER DURING THE ATTACK*

By Clifton M. Miller, M.D., F.A.C.S.,
Richmond, Va.

Hay-fever has occupied the thoughts of the medical profession for many years and the lack of success attending its treatment is made manifest by the almost unlimited number of therapeutic agents that have been used for it.

It has been regarded by many as a so-called neurosis or hysterical manifestation. From this reasoning its existence has been scoffed at and its victims classed with those who could be well if they wished, but preferred the questionable happiness of suffering. That this line of reasoning is not true we are all well aware, for to all of us has come one or more such sufferers during the time of their attack, and that they are all real sufferers is evident.

Of the many therapeutic agents used up to a short time ago none met with any uniform success. The one that was used about the time of the first severe frost was branded as the panacea for that particular person, but his hopes were shattered upon using this remedy in the early part of his next attack.

Correcting deficiency of aeration and drainage of the nose was sometimes of great aid and should always be done if needed, but it should only be done in intervals between attacks. Operative intervention during an attack of hay-fever is not justifiable as it adds to the patient's discomfort and may cause serious infection.

Correcting errors of digestion and regulating the habits of life have been of much assistance in many cases and should be practiced in every case, but such procedure is only an aid to other treatment and must be regarded as such.

Sending the sufferer to another climate, as on a sea-voyage or to some mountainous region where the vegetation is entirely dissimilar to that of the location where he lives is always efficacious in relieving an attack, but the sacrifices of time and money necessary to make such a journey annually are usually too great for the sufferer to make.

The history of the growth and development of the use of pollen extracts with skin tests to determine to what organism the patient is sensitive are too recent in our literature to need more than mention before this audience. Certainly this form of treatment has met with greater success in preventing attacks of hay-fever than any other with which I am acquainted. In spite of the success of such treatment and the general knowledge of it, there are some patients who seek relief only when an attack is on them and with these the use of pollen extracts is of no benefit. It is with

*Read by title, Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

this class of patients that the treatment about to be outlined is used and in my hands it has proven most beneficial.

PREPARATION OF THE FILTRATE

Dry cotton swabs are placed in each side of the nose, well up in the region of the middle turbinate and allowed to remain from three to ten minutes or until thoroughly saturated with the secretion present. The swabs are then removed and placed with about 20 c. c. of sterile water in a small Mandel filter. The filter is now placed over a small glass beaker and the entire apparatus set aside for filtration. The filtration takes from two to six hours, so the patient is directed to return the following day for injection. A fresh filtrate is made for each injection and the injections are given intra-muscularly.

For the first injection, the solution that comes through the filter is diluted, one part of filtrate to seven of sterile water and ½ c. c. of this dilution is given. For the next injection given, dilution is made from one to six, and ¾ c. c. is given, and for each succeeding dose, the dilution is decreased by one and the size of the injection increases by ¼ c. c. Thus when the seventh dose is given, the dilution is only one and the injection 2 c. c. After this, if more is to be given the straight filtrate can be used, but the dosage should be cut back to say a ½ or ¾ c. c., particularly if there has been much local or systemic reaction to the diluted dosage. Following this, the straight filtrate dosage can be increased according to reaction.

Filtrate	Sterile water	Dosage
1 part to	7	½ c. c.
1 part to	6	¾ c. c.
1 part to	5	1 c. c.
1 part to	4	1¼ c. c.
1 part to	3	1½ c. c.
1 part to	2	1¾ c. c.
1 part to	1	2 c. c.
1 part to	0	½ c. c.

In using these injections it has been found that the best results have been gotten in patients in whom a reaction occurred after use of the injection.

Cases histories are too many to be given and are similar in most particulars. One small boy recently was relieved of all of his symptoms after the first injection but his reaction was so marked that he had a temperature of 101° F. and was confined to the bed for 24 hours. This is the most prompt relief yet obtained. About 75% of the cases treated have been entirely relieved or had their symptoms markedly abated by from seven to ten injections.

After use of this, patients should be tested for their specific reaction, but this should be done during the period of freedom from hay-fever. Some will neglect to do this in spite of warnings that it should be done. A number of such patients have come to me for a second seasonal treatment and in the majority of cases, they have stated that their attack was not so severe as it had been the previous year.

This method of treatment was worked out at the suggestion of and in connection with Dr. George W. McKenzie, of Philadelphia, and we have found it beneficial in other forms of rhinorrhea than the one under discussion here.

Stuart Circle Hospital.

SOUTHERN HOSPITAL ASSOCIATION

SYMPOSIUM ON GROUP MEDICINE AND THE CLOSED STAFF

SOME OBSERVATIONS ON GROUP MEDICINE*

By W. P. Harbin, A.B., M.D., F.A.C.S., Rome, Ga.

From the title of my subject you will infer that the facts presented were not obtained from personal experience by being in a group. The writer has been intensely interested in this subject and has visited several groups that have been successful. More has been learned from visiting the clinics of Drs. Quain and Ramstead, of Bismark, N. D., and the clinic of Dr. A. C. Scott at Temple, Tex. The clinic in Bismark began about eighteen years ago. The clinic of Dr. Scott started twenty-eight years ago. These men have had some real experience in team work. I believe that you can learn more by visiting clinics like these than you can in any other way. The members of these two groups were very courteous. Many of the things that they have worked out are personal, and they can tell you things better than they can write them to you. I can not say too much in the way of praise for the men that handle these two groups.

There are not many who have been successful, and it will take time to grow groups in the future. The Mayos at Rochester are pioneers in group work. They have a model which will probably never be duplicated. It has taken time to build this clinic. Dr. W. J. Mayo has said that the proper way for us to do work is in a team of medical men. A great many men in our profession have accepted this statement as being true, because it comes from a great authority and from the greatest clinic in the world. Consequently, many men in this country have assembled in a short space of time a group for the purpose of doing team work.

The most successful groups in this country were not made in this way. The best ones have grown slowly. This remark is not made to deter any one from forming a group. How to do this thing can be learned from studying the ones who have made a success and then try it. The men who know will tell you that it usually takes several years to determine whether or not a given medical man will be suitable to work in a team. Co-workers must be agreeable and harmonize. It is conceded that the younger men are more flexible than the older men. The successful teams have employed the younger men and studied them. After they observe that these young men possess the right kind of quality they retain them in the group, otherwise they are discarded.

The medical profession has in the past needed more harmony than anything else. Today we have more harmony than we have ever had. This desire to work together in the future will bring more genuine harmony than anything that can probably happen.

It is the opinion of many who know that ownership or control of a hospital is necessary for a successful group. The chief of a group has his hands full if he is to manage a group of doctors. If it is necessary to own or control a hospital, the head of a group has a burden in hospital management. One surgeon said to me that it was as hard to get what you want out of a public hospital as it was to run one yourself.

It may be comparatively easy to build and equip a hospital, but it is very difficult to get a group of men who will work agreeably and efficiently together in that institution.

The American College of Surgeons certainly is doing a wonderful work in standardizing hospitals. One of their demands is that every hospital shall require its

*President's Address, Southern Hospital Association, Auxiliary of the Southern Medical Association, Hot Springs, Ark., Nov. 14-17, 1921.

whole staff to meet once per month at least and discuss all cases of interest which were in the hospital during the previous month. This will harmonize the medical profession very much. The question arises as to whether or not a number of groups can work in one of these public hospitals or not.

A prominent surgeon and chief of a group in Oregon, said:

"Of one thing I am certain, and that is that the organized groups must by some means control their own hospitals and all other facilities for the practice of medicine. In the second place, I do not believe that the great number of democratic groups gathered together will meet with any great degree of success whether they own their institutions or not. The great institutions in the future will be those in which there is one dominating personage who, by common consent, is the leader of the group.

"It is quite possible that the plan of the American College of Surgeons standardizing and demanding complete diagnostic equipment in all hospitals will serve the great majority of doctors. I have had too much experience with private hospitals to be satisfied with such an arrangement myself. I think a private hospital answers the purpose better than the general hospital fostered by the American College of Surgeons."

The leader of a team must put the welfare of the patient first. If the leader starts for financial gain, he will probably fail. Dr. Mercur, of Pittsburgh, Pa., says the first requisite for a man to work in a group is good character; second, good judgment; third, knowledge; fourth, personality; and fifth, technical skill.

"A man with a bad character and all the technical skill in the world is the worst creature on earth."

Dr. William Johnson, of Portland, Oregon, said:

"The matter of compensation, I think, in a group has to be taken care of largely by men who are older and who have reached the stage where money does not mean a great deal to them. Some men must sacrifice a good deal for the real pleasure of doing scientific medicine and of training men to succeed, and then the only thing that hurts is the fact that it is awfully hard to get young men to appreciate what you give to them when you take them in and turn over a hand-made practice to them."

This is where the question of character and loyalty should appear.

Dr. Codman, of Boston, says the lack of a real leader is the cause of many failures in groups. He says that too many good things can not be said of the heads of successful teams. He also states that he can make more money practicing alone than he can in a team.

A physician in a small town in Pennsylvania says three years ago nine of his professional friends got together, threw away jealousies and were willing to take the chance of loosing money in a team. He states that they have never declared a dividend.

I visited a large city, not in my own State, called on a former classmate and asked if there were a successful group in town. He said yes, and stated that his relation to this group was very cordial and they were succeeding. He said they did not have a man on their team who was specializing in his specialty. He felt that if they added a man to take up his specialty he might change his attitude. The attitude of the profession in this city is antagonistic to this team.

I asked a prominent surgeon why he did not form a group in his own city and he replied that he could not afford to break the ties that had bound him to his professional friends for so many years.

ASSOCIATION VS. ISOLATION FOR A YOUNG MAN IN PRIVATE PRACTICE*

By Stewart R. Roberts, M.D.,
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A shingle and a gig were easy in the old days and followed naturally after graduation from a rather loose and desultory medical training. The simple days of gig and shingle are gone, and in their stead are the increasing problems of the profoundest and most progressive of the professions. Until recently, isolation in practice has been the dictation of tradition and the custom of successive generations. But the medical graduate of today is another personality; his world is different and his profession is changing so rapidly that even his elders are

*Read before the Southern Hospital Association, Auxiliary of the Southern Medical Association, Hot Springs, Ark., Nov. 14-17, 1921.

often confused in the hithers and thithers of what is commonly called modern medicine.

This new young man has had the best of training and is fresh from the hospital that began his clinical experience. He is between twenty-five and thirty years of age, a man both in years and medicine. He is worthy his medical education, is of good character and health, and is blessed with a besetting ambition and pressed with a sad lack of finances. He is looking for a location and is an eager seeker after a favorable opportunity to begin. Shall he start in association with an older man or shall he venture alone and develop a practice?

Custom would dictate that he begin by himself. More than 90 per cent of his fellow practitioners are alone. We copy more than we think. It is so easy to follow, so difficult sometimes to lead. Most men who begin alone usually remain alone. Even when older they work without a younger associate. The old man rarely changes. He must have the gift of vision and a labile and mobile spirit to vary with the changing currents of medicine, and better to vary ahead of them. Adaptability, like poise, is a great virtue.

If custom does not influence him, a particularly individualistic temperament may. A man may not be able to work in double harness. He either never started or his habits are too fixed and he cannot begin. The extreme individualists in medicine cannot work together no matter how the harness is put on. It is not the harness or the pull, but the pulling together, and he cannot keep his eye or mind off his fellow worker. No matter how small the circle, he prefers to be the entire circle. He is the "I" man, and uses the word "we" professionally very rarely. In him is a distinct sense of the importance of his individual professional identity.

With the admission of the force of custom and the influence of temperament, the contrast between association and isolation can be put in a discussion of relations and advantages.

(1) The waiting years are abolished in association. The practice is there. An older man is producing. Untold thousands of years have been wasted waiting for practice. Think of the elder Janeway waiting two years for a patient. Theoretically, these should be years of study and outpatient work, but study without patients is tiresome and outpatient work apart from the large centers is impossible. The transition from a busy hospital and the busy life of an interne to a small office and much idleness leads easily to a sluggish reaction, the paresis of an enforced inertia, and ways of discouragement.

(2) Experience in an association begins at once. Practice is a prerequisite both for experience and development. Experience is the clinical capital of the practitioner. In isolation for the first five years it accumulates slowly and pays dividends grudgingly.

(3) Very few young doctors just beginning can have the equipment they really need. There is apparently no limit nowadays to the chaotic succession of instruments of precision. After one buys them, he finds he needs them less than he thought. There are certain necessary and fundamental aids of equipment that must be had for average practice. All these and more can be had in an association because the older man has accumulated them. This applies to journals and books as well. The two new financial problems in medicine are those of equipment and of overhead expense.

(4) The worry of finances at this period is eliminated by an association. A comfortable living at least is assured. With the certainty of income, one can, without anxiety, do better work and be of more value in practice. Anxiety over finances is not conducive to a rich clinical intellect. The details of the financial arrangement involve either a stated salary, a salary and a per cent of the profits, or a definite per cent, usually increasing from year to year or in definite periods of years. A salary in the beginning is usually advisable until the young man shows his qualities and his medical gifts. Whatever the arrangement, his financial safety permits his easy clinical development.

Think of John Hunter unleashed from his financial load.

(5) The thoughtful, scientific young doctor lacks confidence as surely as he lacks experience, and probably because he does lack experience. One of the finest things in all medicine is the enthusiasm with which he tries to do his work well. His hard cases torment him with doubt and responsibility. He delights to accept every opportunity he has to talk his cases over with a colleague whom he trusts. The older man or the group is back of him and will stand by him. We are all seeking power. Knowledge to the young man is power, but he may be timid in execution. He has in the hollow of his hand the standing and the stimulation of his crowd. His potential powers become more easily kinetic and practical, and he can apply his gifts more quickly. The medical school and hospital interneship must always omit much that the young doctor can only learn in the actual practice of medicine. There is something in practice that is not anywhere else. A close example in an active practitioner is invaluable, provided, of course, that his ideals and abilities are of the best and far removed from the perilous edges of immorality and incompetency.

(6) In a union of effort he has less strain and he can have more regular hours. There is a division of labor with a distribution of time and duties in the person of secretary or bookkeeper or technician. He can, therefore, concentrate and follow his bent. It is the ceaseless details of practice, and not practice itself, that numb the intellect and dull the keen edge of judgment. Practice itself is a pleasure.

(7) In an organization the work goes on and the different men in turn attend the different medical societies, take graduate work or go on their vacations. When a man is alone, an absence means the cessation of everything until his return. He is often loath or unable to leave even when he may need to go. His patients might benefit were he to air his brain and rest his body. The medical mind must weigh anchor at intervals or routine will stifle growth.

(8) The young man meets more people and as a rule a higher class clientele than if alone. His broadening process begins earlier, socially, as well as intellectually and clinically. He is established the sooner as a well known citizen and an active personality in the community. To be called in medicine one must first be known.

(9) He has everything to gain and little to lose by an association. The established man or group has little to gain and much to lose. The older man has by self-denial, study, mistakes, knocks, triumphs, character, common sense and ability, come to the full flowering of his labors. His younger associate from the beginning enters into the first fruits of those labors.

(10) The young man is often apt to overlook these elements of the struggle, to have little patience and much desire, to permit ambition to thwart judgment, to accent his training rather than his present opportunities, and to attempt to leap rather than to climb up to his proper place which only the years hand out to the hard workers who have endured the load. St. James intimated that faith without work is dead, and in medicine particularly, there is little reward without years of much work and more faith. Working is better than waiting.

(11) There are many medical students being graduated every year and a vacancy is not hard to fill. The older man might remember that a poor place with little opportunity and a niggardly reward is very easy for the young man to leave. The wise youngster is more concerned in the opportunity for his clinical development than in the immediate financial return, unless, of course, he be overwhelmed by an impetuous desire for marriage or the embarrassment of a long delayed debt.

Many young men advance three objections to an association or a group: (a) They feel they are overshadowed by the reputation and the ability of the older men. This is all the more reason they should remain within the shadow until their own lengthens. Ultimately age will shorten the shadows of the elders, and if they be of the right sort, increasing age will lengthen their own. (b) "My identity

is lost. If he should die, what would become of me?" The competent with character always maintain their personality with dignity, and a real man in medicine as elsewhere always lands on his feet running no matter what happens. The plea for identity is sometimes a confession of a sense of one's importance that becomes apparent only by one's isolation. (c) My income will come faster alone by doing a more general "catch as catch can" practice. This may be true. If income in the beginning is more important than opportunity, it may come true. On the whole, in the long run, with the right association, the income will come sooner, increase faster, and wax greater. In union is financial strength. It is exceedingly difficult to commercialize human suffering. No man can do it long, the youngster not at all. A just reward is all that medicine offers. There is more money in patent medicines.

The youngster is apt to make the mistake of using an association as a stepping stone to isolation. "I shall take this until I can get out by myself." An association worth beginning is worth maintaining compatible with fair relations and a good future. It is doubtful that one can build a great practice more than once in a lifetime. A man should start where he expects to remain. Two or more men can build better than one. Ability and income increase far more rapidly after ten years than in the first few years. A youngster can make no better investment than working, staying and waiting in one place.

The older men as a class may have three objections to an association: (a) "The young man may get acquainted with my patients, then leave me and take some of my practice." The prophets are dead. No man knows what will happen; but, if the young man is treated well, given free rein to work and develop, and the reward is just, he will not leave as a rule. There are plenty of patients any how. (b) An association is expensive. Yes, and an isolation is more expensive in wear and tear and health, and the busy doctor needs help. The cost of dividing the burden is cheap, for the young man can aid in a thousand ways, in time draw practice to himself, and add invaluable ideas. (c) "I had rather do everything myself and know it will be well done." One can no more do everything himself, not even in a large general practice. "To know it will be well done" may mean "to do it my way." There may be a newer, better way, and the youngster probably knows that way. He is fresh and not tired. Try him.

The older man or the small group is apt to make the mistake of calling the young man "an assistant," announcing him to the patients as "my assistant," and cowing him with a sense of his inferiority. This young man is a doctor by knowledge and by law. His American democracy resents the title of "assistant." It may do in the European clinics and the offices of the Continent. Here it would be well to abolish this application of the word and instead use the term "associate." This means much to the young doctor. He is willing to begin at the bottom, to deny himself, to work hard, but as an associate in a place of opportunity and not with a title that emphasizes his inferior station. He is going to have enough troubles in practice at best. The forceful young man will prefer greater self-denial alone to an unmeant humiliation. This sore point and the environment it produces has pushed many a sensitive youngster out of an association. If he be worthy, trust him, push him, train him, and the job is gloriously worth while. If he is unworthy, let him go.

Every association is fraught with danger and fragrant with a charming promise. In time and sense we speak of forming an association, but really we grow up into the relation. It is as much a relation of mind and spirit as of labor and finances. Whatever the terms, a mutual confidence, congeniality and respect are fundamental. Faith is an essential possession; faith in each other, in the work, in the future. The trend of the times is against the solitary young man in medicine. He may gratify his medical whims and escape all the worries of a broader medical life. He may persuade himself that the medical world will soon be at his feet. It is risky to run counter to the mighty currents of progress. Two heads are better than one. The division of labor is bound to come

more and more. Wherever two or more are gathered together in the name of a patient, a medical society is in session, and the friction of bright minds causes the spark of truth to scintillate to the benefit of the patient and the learning of medicine. The main thing is the man. And, after all, and through either association or isolation, in the words of David Harum, "human nature is human nature, only more so."

THE ORGANIZED OR CLOSED STAFF: ITS ADVANTAGES AND POSSIBILITIES*

By J. B. Franklin,
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PRIVATE INSTITUTIONS

This paper makes no reference to, and does not in any sense take into account, privately owned or privately operated institutions.

PUBLIC INSTITUTIONS

The writer has kept constantly in mind free hospitals, owned and operated by the state, the county, or the municipality, and supported by public taxation; and mixed hospitals, receiving both free and pay patients, operated by boards of trustees, or by similar authority, and maintained by donations, bequests, endowments, and earnings from pay patients.

CAUSES AND PURPOSES

Before we can wisely pass judgment upon "effects and results" we must know something of the "causes and purposes." Abstractly, a thing may appear harmful and without merit, but when the cause and purpose are known our viewpoint changes, and with it our opinion. To illustrate, if you should walk down one of the streets of this city tomorrow morning and should come upon a policeman just as he fires his pistol, killing a beautiful collie dog, the pet and constant companion of a little boy, who was standing near by and weeping over the loss of his pet, you would in all probability immediately exclaim, "It's a shame." But if you should then learn that the dog was hopelessly mad, and, therefore, dangerous to human life, you would change your opinion and praise the policeman for removing the cause before the results were worse.

For the reasons mentioned above, before we can wisely pass judgment upon the merits and demerits of an "organized, closed, selected, or limited staff," we must analyze and understand the cause and purpose leading to such a procedure.

MEDICAL STAFF

Of course, the medical staff is a department of a hospital. But what is a hospital, and, primarily, why and for whom does it exist? The answer determines your thinking and mine as regards the title of this paper.

WHAT A HOSPITAL IS

My own conception of a hospital is that, primarily, it is an institution for the best care and treatment of the medically and surgically sick, or "a sacred community trust, pledged to use its property and opportunities for the prevention and cure of disease, and for the preservation of human life." In other words, hospitals are built, operated and maintained essentially for the best service to the patient. Doctors and nurses are educated fundamentally for the best good of the sick. Therefore, primarily, hospitals are built and operated, and doctors and nurses are educated, to help relieve, as best they can, human suffering. This puts before us clearly, I hope, the primary cause and purpose of hospitals.

If the patient is the first consideration in the erection of hospital buildings, and in the education of doctors and nurses, should he not also be the prime consideration in the departmental organization and in the general operation of the hospital? Should his best interests not be considered in the making of hospital rules and regulations, and in his care and treatment? Since he is the cause of the existence of such facilities, does he not deserve

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to have them used in the way, and by whom, the greatest efficiency may be obtained and the best results accomplished? Is not all of this logical, reasonable, and right?

PROFESSIONS AND TRADES

Fortunately, all men and women are not endowed with the same gifts, natal or cultivated ability, or even desires; nor are they equally educated. We must have our various professions and trades. All men and women who aspire to be physicians or surgeons do not attain the same degree of efficiency and do not have the same large vision, high ideals and lofty purposes. Some who are attempting the practice of medicine would do better work as carpenters, blacksmiths or other tradesmen. It is the business and duty of those charged with the responsibility of managing and directing hospitals to know the facts concerning the members of the medical profession, at least in their respective communities, and in the interest of preserving human life, protect the public against incompetence as best they can within the hospital. Men and women who are able to contribute to the support of free work in hospitals are justified in withholding such support to hospitals which abandon their patients to the mercies of incompetent healers.

SELECTING A DOCTOR

Life, as a rule, is as precious to the uninformed as it is to the informed. It may be surprising to those who have not had occasion to investigate to learn how many individuals, and even families, there are who have no family physician, and who have not required the services of a doctor through a long period of time, and, therefore, if occasion demanded, would not know what doctor to call. And, too, there are others who do have their regular family physician, in whom they have the utmost confidence, and would permit him to undertake any kind of a surgical operation or would permit any other doctor the family physician might recommend to perform any kind of operation. Such confidence is wisely bestowed if, and only when, the family physician knows his own limitations and is thoroughly conscientious and honest. It is in some such cases that the practice of dividing fees has crept in. All of this is said to show that the hospital management has a moral obligation to the public to protect it against incompetence.

TEACHING HOSPITALS' REQUIREMENTS

Based upon the foregoing statements, I am now ready to say that I believe the public health, and human life generally, would be best conserved if every hospital in the land would confine its facilities and privileges to a selected, limited, or picked group, capable of organization, or if you choose to say "closed staff." Such a group or staff may be, and often should be, subdivided with varying privileges to the different members to correspond with their duties, experience, ability, etc. Particularly is the subdivision idea applicable to that group of institutions known as "teaching hospitals." In behalf of medical education, there are certain conditions and requirements teaching hospitals must meet. For example: the Council on Medical Education requires a Class A medical college to furnish, among other things, to the faculty members a minimum of 200 hospital beds for every 100, or fraction thereof, of senior medical students; therefore, the teaching hospital must supply these beds. To this extent, at least, a teaching hospital must limit its facilities and privileges to faculty members, a selected, organized group. If the teaching hospital is fortunate enough to have an excess of beds over this requirement, and the excess be properly segregated, such beds may be made available to a selected group of doctors, or courtesy staff, not connected with the medical college or dispensary, but who are competent in their respective lines.

EDUCATIONAL FEATURES

I here quote an editorial from the *Modern Hospital*, May, 1921:

"None will deny the need of a system of medical education. No fair-minded man will refuse to concede that medical students, graduate as well as undergraduate, are entitled to be taught by the ablest men that can be obtained. If the development of competent clinical instructors can best be accomplished by conferring special hospital privileges upon a relatively small group, such privileges should be conferred, not

as a favor to the group immediately benefited, but in the best interests of the medical profession and of the nation. Herein lies the justification of the closed or organized staff.

"Those who are honored by staff appointment must recognize their obligations and do their duty. The staff of the closed hospital must teach. It must teach undergraduates in hospitals which are attached to medical schools, teach internes in hospitals, teach non-staff physicians everywhere. The closed or organized staff hospital is bound to maintain a grade of practice above the average, and to use its special opportunities and privileges in the broadest manner consistent with the safety of its patients and the welfare of the community.

"The organized staff hospital must be a research hospital as a matter of course, for it possesses by far the best opportunities for the systematic study of disease. The members of the staff must be chosen for their ability to work at the bedside or in the laboratory, individually and in team formation. The hospital staff must ceaselessly practice self-criticism. It must work in the open, thus unequivocally demonstrating its sincerity of purpose. As a matter of practical necessity, the bulk of the medical profession must be excluded from membership in the staff organization, but no educated medical man may properly be excluded from its benefits."

OBJECTIONS OF SOME DOCTORS

But there is another group of men to be dealt with. In some communities, and particularly in cities, there are trained and competent medical men who will object to the organized staff for the reason that thereby their own privileges may be somewhat curtailed, or their classification may thereby not be quite so high as that of others, or some other men may thereby enjoy greater privileges. Such cases should be carefully and wisely considered and an honest decision made and acted upon. The attitude of no individual, however, should be permitted to change the righteous purpose of the institution or to retard, in the least, the progress of its work.

OPEN STAFF FOR FINANCIAL REASON

Some hospital authorities oppose the organized or closed staff for the reason that they fear the staff may not be able to keep the hospital beds filled, and thus cause a financial loss to the institution. In my judgment, this is a short-sighted policy and a grave mistake. It would be better for the hospital to suffer a financial loss than for the patient to suffer ill-treatment and possibly lose his life. But a hospital will not long sustain a financial loss under such circumstances because, with a competent organized staff and good administration, the hospital will ultimately acquire sufficient reputation for preventing and curing disease and general conservation of human life to keep its beds filled. Scientific and competent service has its dominant drawing points that count even in dollars and cents.

STANDARDIZATION OF HOSPITALS

Probably all of us are familiar with the efforts now being made by the American College of Surgeons to standardize hospitals. A splendid work has been done. The "minimum standard" for classification by the College is reasonable, practical, and in thorough harmony with this paper. The minimum standard, however, is not being met by possibly a majority of hospitals now on the classified list of the College of Surgeons. Consider for a moment the conditions of the minimum standard.

The Standard provides:

(1) That physicians and surgeons privileged to practice in the hospital be organized as a definite group or staff. Such organization has nothing to do with the question as to whether the hospital is "open" or "closed," nor need it affect the various existing types of staff organization. The word staff is here defined as the group of doctors who practice in the hospital, inclusive of all groups, such as the "regular staff," the "visiting staff," and the "associate staff."

(2) That membership upon the staff be restricted to physicians and surgeons who are (a) competent in their respective fields and (b) worthy in character and in matters of professional ethics; that in this latter connection the practice of the division of fees, under any guise whatever, be prohibited.

(3) That the staff initiate and, with the approval of the governing board of the hospital, adopt rules, regulations and policies governing the professional work of the hospital; that these rules, regulations and policies specifically provide:

(a) That staff meetings be held at least once each month. (In large hospitals the departments may choose to meet separately.)

(b) That the staff review and analyze at regular intervals the clinical experience of the staff in the various departments of the hospital, such as medicine, surgery and obstetrics; the clinical records of patients, free and pay, to be the basis for such review and analyses.

(4) That accurate and complete case records be written for all patients and filed in the hospital, a complete case record being one, except

in an emergency, which includes the personal history; the physical examination, with clinical, pathological and x-ray findings when indicated; the working diagnosis; the treatment, medical and surgical; the medical progress; the condition on discharge with final diagnosis; and, in case of death, the autopsy findings when available.

(5) That clinical laboratory facilities be available for the study, diagnosis and treatment of patients, these facilities to include at least chemical, bacteriological, serological, histological, radiographic and fluoroscopic service in charge of trained technicians.

The first condition is "that physicians and surgeons privileged to practice be organized, etc." This definitely implies a selected or limited group, and that there are those not privileged to practice in the said hospital, and further that organization is essential. An incoherent and indefinite number of fundamentally unsympathetic men and women cannot be organized.

Condition number two says

"that membership upon the staff be restricted to physicians and surgeons who are (a) competent in their respective lines, and (b) worthy in character and in matters of professional ethics."

This wording does not simply imply, but definitely states that staff membership must be restricted. A restricted membership makes a "closed staff." A privileged and restricted, competent and ethical group alone can be organized.

The other conditions provide for regular staff organization, staff meetings, rules, etc.; for full and complete case records, including history, physical, laboratory and x-ray findings, etc., which are very essential, and practicable only in an organized or closed staff.

The aim for all of this is to do away with careless diagnoses and medical treatments, to prevent unnecessary surgical operations, to prevent operations being undertaken by unskilled surgeons, to prevent avoidable mistakes from happening the second time. In short, to create and protect the right to be well for every man, woman and child to the limit of the highest medical and surgical skill. When the members of such a hospital staff, as the minimum standard contemplates, cooperate in dead earnest, they are sure to render competent service to all the patients in the hospital, and in so doing, they create public confidence, and public good will, and these are bound to beget financial returns.

No hospital throwing wide-open its doors, inviting alike all doctors of all schools who hold a license to practice to partake of its privileges, can possibly meet the minimum standard, or can ever hope to be practically more than a mere boarding house for the sick, or can maintain standards sufficiently high to command even its own self-respect, or the wholesome respect of the communities in which it is placed. Without limitations, organization, system, rules, etc., a hospital can not do effective work. It is in such wide-open hospitals that the "blacksmith" type of surgeon butchers and kills his patient, and in some the pernicious practice of dividing fees thrives. In the organized staff, every member must sign a pledge definitely agreeing not to split fees.

The organized, or closed staff, is not in any way detrimental to the honest and conscientious general practitioner, who is so necessary, and whom we all love. To the contrary, it is for his and his patient's good. It simply provides for him a safe and scientific place where he may take his patient, when the patient has a condition he cannot control in the home. It gives him an affiliation or alignment with a group of scientific men whose ability is recognized and whose ethical standing is above reproach. It gives him an opportunity to "brush-up" on methods and ideas, by observation and consultation with men who are required to keep up with the latest and best in the profession. The organized or closed staff takes nothing of value from the general practitioner, but gives him an opportunity to serve better his clients, to add to his own personal efficiency and thereby increase his community reputation, his finances and the measure of his professional success.

Here I quote again from the *Modern Hospital*, May, 1921.

"The hospital staff must be prepared, at all times, to assist the general practitioner in diagnosis and treatment. The general practitioner should be invited to witness the treatment of his patients in its wards and operating rooms. Both clinical and pathological conferences should be thrown open to him. Courses of lectures and demonstrations should be instituted for his benefit. In brief, the staff hospital is charged with

the duty of maintaining contact with the general practitioner and of keeping him constantly aware of and interested in its work and progress, and this is perhaps the only way in which the excluded general practitioner can be effectually and permanently separated from his present unholy and damaging alliance with the enemies of scientific medicine.

"The staff hospital can best serve the practitioner, not by abandoning its exclusive form of organization, for this is indispensable to the maintenance of proper clinical standards in research, in teaching, and in medical progress generally, but by making its organization function with maximum efficiency. By doing its full duty, the staff hospital may avert a public calamity and a national disgrace."

RIGHTS OF THE PUBLIC

The organized or closed staff is not inimical to the rights of the public. What rights have the public? The public has a right to expect a good hospital bed for every sick man, woman, and child in the community, and the public has a right to expect good medical or surgical, and nursing care. Here the rights for the public cease, and the rights for the hospital begin. The responsibility of furnishing a good bed with competent service rests upon the hospital, and the hospital must perform this duty in its own conscientious way. Individuals may prefer, or desire, a doctor who is not on the staff, but such patients have no right to demand that doctor, who may perchance be a homeopath, osteopath, eclectic, chiropractor, or any other school or cult. How can such a mixture as this organize, systematize, harmonize and cooperate? If the hospital management has a right to eliminate one legal school, it has the right to eliminate all but one, and if it has this right, it also has the same right to eliminate all the "undesirables," for whatever reason, of that school. Certainly good service can be rendered day in and day out, year in and year out, only by such systematic organization and persistent cooperation as is actually practicable.

The hospital must select doctors who are competent, who are in sympathy with its organization and purpose, who know how to harmonize and cooperate, and who have work enough to justify a connection. Surely, if there is a thoroughly competent and desirable doctor in a hospital community, the hospital will have that doctor on its staff, unless there is some good reason for not having him, either from the hospital's side or from the doctor's side. This would be true from a selfish financial standpoint, if not otherwise. It is the doctor who has a patient in the hospital, but infrequently, who creates serious friction, due to his unavoidable ignorance of routines and customs, and who causes trouble because of his lack of sympathy with the purposes of the institution. Therefore, a distinction must be drawn between the rights of the public and the rights of the hospital. Certainly the wise hospital superintendent will do all he can to meet all the desires of the public, consistent with that public's real welfare.

THE GREAT MIDDLE CLASS

It has been said often that only the rich and free patients get the best service a hospital is capable of rendering. The former can pay for everything wanted, including x-ray and radium treatments, special laboratory work, consultation, etc.; and the latter get all such service free. The great middle class, largely the salaried class, do not want charity, but cannot pay large or even customary fees for the various services needed, and particularly expensive consultations. This condition can be overcome largely by group practitioners, but all staff members may not believe in, or find it advantageous or possible to enter such a group. This group formation will be referred to again later in this paper.

The great middle class must be given the proper consideration. I believe such people are entitled to the best service the hospital can render, at a reasonable cost. Here is where the organized staff is best calculated to function efficiently.

I believe that there may be and should be such a spirit of loyalty and cooperation between staff members as to make it a practice, and even a rule, that one staff man may call in consultation any other, at a very nominal cost, if not altogether on the basis of pure reciprocity. In other words, there may be and should be, staff cooperation and reciprocity to the end, and to the extent that every patient, pauper, middle class or rich, may and shall have, the largest benefits of group opinion and service, at a moderate or proportionate cost.

PRIVILEGES AND TRAINING OF JUNIOR SURGEONS

In surgery as in all other lines of human endeavor, experience is paramount. On every organized hospital staff, there should be some bright and well-trained young men who aspire to become competent surgeons. Such men, however, are naturally lacking in the proper amount of experience. Major surgery is not a thing to be trifled with. It should not be undertaken indiscriminately. Many ambitious young men, because of inexperience, will often operate upon cases that the older men refuse to operate upon and frequently with disastrous results. My thought is that junior surgeons should be permitted to do minor work unassisted by senior surgeons, but that they should not be permitted to perform major operations without the assistance of senior men, until such time as the senior surgeons on the staff can conscientiously recommend them for such privileges. This should apply both to private cases and to free cases coming through the dispensary. This means a protection to human life, and a sane and safe education to the junior surgeons. The ways and means of working this out probably can be better solved in each instance by the local staff.

GROUP ORGANIZATION AND PRACTICE

Group practice of medicine has many advantages, but in the organized staff, it also has its disadvantages. A staff member who is not associated with a group, and also his patients, find the group idea not always satisfactory. Such a staff member is limited in his consultants, and in those to whom he may refer cases that are not in his special line. If he calls in consultation a member of a group, or firm, there is a strong probability that he may lose his patient in favor of the group or firm, for subsequent practice. If he is an internist and has a patient with a surgical condition, and he refers the patient to a surgeon connected with a group also having an internist as a member, he is liable to lose the patient and his family as clients. This is not meant as an insinuation, or to cast reflection in any way, but as a statement of a natural and logical consequence.

An organized group, within the staff, will usually have one or more young men attached in some way, who are seeking experience, and for whom experience is being sought by the group. And such doctor or doctors may often interfere with the duties and privileges, and thus the training, of internes. Particularly is this true in surgical operations. The operator will want his young assistants to help him, and this naturally deprives the interne of experience he is entitled to receive.

These comments are not made to condemn group practice, but to point out some possible difficulties, with the hope that they may be overcome. The ideal but perhaps impractical, solution would be to make the group all inclusive, that is to say identical with the staff itself, and thus have no interior groups or cliques within the staff.

ANESTHETICS

The question of anesthesia is important, and is quite a live one in some places. The patient is entitled to a proper anesthetic, and if it is charged for, the price should be reasonable. The surgeon is entitled to have a competent anesthetist on hand to take care of his patient when he is ready to operate. I conceive it to be the duty of the hospital to serve satisfactorily both the patient and the surgeon, but always to be in close cooperation with the surgeon. To this end therefore, there should be a regularly appointed and organized anesthetic staff, with a competent head, who shall have such assistants as may be needed to take adequate care of the local requirements, all working under rules and regulations to be formulated to suit the particular situation. The result will be team work between operator and anesthetist, better service to the patient, and in pay cases, a reasonable and uniform charge.

NURSING SERVICE

Already, it is universally conceded that the hospital must organize, direct and control its nursing service, graduate and under-graduate. The indisputable necessity for this was recognized some time ago.

SUMMARY OF RESULTS

And finally, all of this regulation and control makes for the widest latitude in studying and preventing disease; for the most effective means of combating dis-

ease; for the best service in every way for the patient; for the most effective training of internes and nurses; for the greatest conservation of human life; and for the making of the most inviting and desirable atmosphere in which the participants may work.

THE ADVANTAGES AND DISADVANTAGES OF GROUP PRACTICE

THE RELATION OF A GROUP TO A PUBLIC HOSPITAL

IS IT ESSENTIAL FOR A GROUP TO CONTROL ITS HOSPITAL?*

General discussion of the above subjects here follows:

Dr. Stuart McGuire, Richmond, Va.—I do not know whether I have a group or not. I have my assistants on salaries, and pay my consultants a fee. I render my patients a bill for the whole amount and settle afterward with the consultants.

Dr. A. L. Blesh, Oklahoma City, Okla.—My experience with group practice leads me to believe that such groups must grow, recruiting young men from time to time as the need for additional help appears. It can not be hastily thrown together from men engaged in active practice each having developed independently without having cultivated the cooperating spirit. I do not think it can be successfully organized on democratic principles. It must have a commanding officer. My experience leads me to believe that it must be organized as a business, with a capitalization based upon the total income. Upon this income salaries should be based. These should be rated so that at the end of the year there will be a surplus.

In order to do its best work, a group should own and operate its own hospital. This is but the enlargement of the private hospital idea. I am aware of the fact that the present trend is away from privately owned toward publicly owned or church owned and managed hospitals. I feel sure that the American College of Surgeons in its classification is striking hard at the small hospital. But small hospitals like large hospitals are both good and bad. The size of the institution does not fashion its qualities. Unfortunately, public owned institutions are only too often honeycombed with politics. Also, unfortunately very often the church owned institutions are very good hospitals but loose staffed. Church politics also enter here, in that the staff is frequently selected from good members of the church, rather than from the merits of the individual. But to my mind the fatal difficulty in staff organizations in so many of these institutions lies in the fact that each staff member is conducting his own practice largely for his own benefit independent of his fellow staff members, and team work is therefore very difficult to secure. There is no commanding officer as a rule worthy of the name.

In a large and very good church institution which I now have in mind, the chief of staff is absolutely unable to command any part of the situation, while the institution itself plays around one member of the staff who is a member of that particular church. These of course are all defects which in time may be ironed out. But I fear that good time will be a long time coming while human nature remains as it is.

The trend of the state and church hospital is toward nationalization of the profession, and the question is: Are we ready for that, or do we desire it? Until that time comes, at least, there will be a large field for the private and especially for the group owned and operated hospitals.

I believe greater efficiency is secured in the latter than in the former. I also believe that there will be a closer staff cooperation in the group owned and operated hospitals which will be a benefit to the patient. I am not at all in sympathy with the statement made by Dr. Cabot recently in Kansas City, in which statement he branded the small hospital. The argument used by him to condemn this can be used equally well for very many of the large hospitals. It has been my custom to visit all the larger institutions in this country and abroad and to visit the smaller hospitals as well. I have seen as good work in the latter as in the former and as bad work in the one as in the other.

Hospitals should be run upon business principles and the charity work done should be budgeted exactly as the other work. There are no looser finances than are practiced in most of our large hospitals. I am sure a group of men with a good business manager could take these finances and accomplish far more than is done by most of the large hospitals, with which I am acquainted.

It should go without saying, that a group must be composed of all the medical specialties.

Dr. J. A. Stucky, Lexington, Ky.—Not only has group medicine been a personal help to me, saving my time and the time of my patient, and the expense for the patient, but the most encouraging and stimulating feature has been my observation of the close association of this body of men with the younger members of the group. It is a stimulation and inspiration to pass the progressive and aggressive younger members in the halls of the building and have them refer to the cases we have seen jointly in the past two or three days. In this way I am kept in touch with the larger field of medicine, being aided by the different specialists of the laboratory, neurology, radiography, etc., and do not feel isolated, even by the largeness of my own special field of work. Undoubtedly it would be better and more satisfactory in every way if each group could control its own hospital. In this way the standard of the hospital and the keeping up-to-date of each member of the group or faculty would be satisfactorily accomplished, but the standardization of hospitals is hardest on the small hospitals.

Dr. Arthur W. Ralls, Gadsden, Ala.—We have a fifty-bed hospital, which in sixteen years has grown from twelve beds. Seven men draw salaries from this institution, but the institution is privately owned and is not a stock company. The

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*General Discussion, Southern Hospital Association, Auxiliary of the Southern Medical Association, Hot Springs, Ark., Nov. 14-17, 1921.

institution did not begin with the idea of developing a group, and in fact we do not call ourselves a group; but increased work from time to time demanded that we increase our medical force.

Our different men have been trained in particular branches, and they are responsible for the maintenance of these branches.

The returned soldiers from the World War who have had the advantages of group work in the Army, will never again be satisfied with the one man idea in medicine. This principle was drilled into them by actual practice, and they will disseminate this idea to their families at home.

For a man to succeed at the head of a group, he must be thoroughly honest with the associated doctors and his patients, and he must be a man of professional merit, and maintain the respect of his co-workers. The most important principle in the developing of young men in a group is that remuneration must be ample for their welfare, and material progress, and the young man must be allowed to develop himself and not be made to lose his professional or natural identity. In other words, if a young man can feel that he has an individuality, and that he is an important factor in the group work, and if he is given proper credit for his labors, then he has an incentive for good work, and is not easily dissatisfied.

Dr. E. A. Stevens, Mayfield, Ky.—In considering group practice the satisfaction that the doctor gets from the work counts for something. It is the only way that most cities with a population of five or six thousand can get a well equipped hospital. The people in the city of this size must usually be transported many miles to secure hospital service, and in many acute cases the time required for this makes the difference between success and failure.

Even if there should be some kind of a hospital in a city of this size, the equipment is usually inadequate, and the man-power insufficient.

The best arrangement for group practice in a small city is the association of two or more elderly men who have the money to build and equip a hospital, and enough competent and ambitious young men who are anxious to put their ability, industry and enthusiasm against the financial outlay of the older men.

It is well that the older men should not be too anxious to make money, as it may be necessary for some sacrifices to be made at least for a time. A full-grown business seldom springs up over night. It is also well if at least a part of the group should have an established practice to sustain the enterprise during its development.

There are some disadvantages in group practice, but taking it all in all, a group can do far better for the worst patients than the single doctor can do, and most people must depend upon the local profession for the aid they get. From the doctor's side it is his only chance for first class equipment in his work. Medical knowledge that cannot be applied is of no real value. The greatest danger is that the hospital will not be well equipped, and if it is not, just to that extent the effort is a failure.

Dr. E. B. Bradley, Lexington, Ky.—The Lexington Clinic was formed by nine men going into partnership, seven of whom had been in the Army; building a special building and participating in the expense on the ratio of their former earnings. Now all are on salary and the excess profit is shared equally. Salaries are reduced 5% each year. They do not own their own hospital, but use the two local institutions. Most of the work is that referred from out of town.

Dr. George Dock, St. Louis, Mo.—General hospitals can not make money and even special ones can do so only with the most perfect economy of administration. I have always thought it unfortunate that the word group came into use rather than team. An essential matter in all such cases is to have thoroughly coordinated work such as we associate with a team. In groups it too often happens that the patient has a large number of examinations, but no one rounds up the complete diagnosis and no one is responsible for the complete care of the patient. Such groups are likely to fail. Team work, or coordination, is by no means natural in most people. We see this in all kinds of games and Mr. Graham Wallas has shown very strikingly how the absence of team work kept back the winning of the war and added greatly to the cost in lives and goods.

For many years I have been working in a team in a hospital. We try to cultivate the team spirit so that men who go out can take their part in what I think to be a very essential feature in future practice. Thus, a fourth year student, who is assigned to every patient, acts as general practitioner in charge of the case. He is encouraged to get all of the assistance he can from the house staff, who correspond to the neighboring consultant; also to see that all consultations with specialists that may be useful are held, and not merely to send the patients to specialists and read the reports, but to be present at the examinations, write notes at the dictation of the specialists, ask questions and then see that the directions are followed. In regard to fees, we find the matter in a most unsatisfactory condition. Many patients are referred to us by physicians, but some patients have an idea that because the staff does not profit personally from the fees, no fees are to be paid. Even with printed statements in the hands of the patients and verbal statements on admission many of them object to paying their professional bills. Also the rational fixing of a bill for complete examination is by no means settled and needs very thorough discussion.

In regard to the closed staff, one must distinguish between hospitals and what might be called, as in England, nursing homes. The true hospital must have not only a closed staff, but a coordinated, cooperating staff. There is a need for hospitals for patients who do not need this sort of service and this difference, I think, should be more thoroughly considered than it has been in the standardization of hospitals. By setting the same standard for a special hospital, which may be satisfactorily run by a small team, we run the risk of lowering the standard of a good many other more important institutions.

Dr. H. H. Trout, Roanoke, Va.—One of the most important interests of the group is a good business manager who will make investigations into the financial standing of patients so that charges may be made accordingly. Weekly staff meetings and a journal club are advocated. The business manager has a weekly conference with members of the staff.

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EDITORIAL DEPARTMENT

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MALARIA AND THE SOUTH

On one of his adventurous journeys Sinbad the Sailor encountered the Old Man of the Sea and complained bitterly at having to carry him on his back. The old fellow proved an irksome load to tote around and made a nuisance of himself in many ways. He spoiled Sinbad's comfort completely; and had Sinbad been inclined to follow any useful occupation (which the story does not indicate) no doubt his efficiency would have been rated much below normal by the experts of that day and time. Like Sinbad, the South has carried not one but two enormous burdens year after year, malaria and yellow fever — Pelion piled on Ossa—shaking and sweating under this weary load with every step taken toward agricultural development and economic prosperity.

A few years ago the burden of yellow fever was thrown off and the Southern cities which had been periodically afflicted arose, shook themselves in their might and began an era of unprecedented growth and business prosperity. Unfortunately the same relief has not yet been obtained in rural communities from the malaria burden. The stegomyia mosquito being city-bred is more easily controlled than his country cousin, anopheles. We who know the South know that a significant and widespread amelioration of malaria conditions has taken place within the past few decades. We have nothing like the amount of malaria in the South now that we had twenty-five years ago. Going back fifty years, malaria was common north of the Ohio River. Now malaria has practically disappeared from the Ohio and the northern Mississippi Valleys. But the South still has too much malaria, and the South remains condemned in the eyes of the world as a hot-bed of this disease. Confronted as it is with these conditions, the South must do two things: first, wage a properly planned and long-continued fight against malaria until it has become a negligible factor in the health and welfare of every citizen; second, let the outside world know how the battle goes as malaria is controlled in one community after another, in order that we may not be forever judged by standards of fifty years ago.

The final eradication or control of malaria in the South is no small undertaking, and it were better that we realized this in the very beginning. There will be work enough for every one who loves the South, and glory enough for all when the fight is finally won, as it must and will be. The state and local health authorities must lead the battle array against malaria. They have already outlined their program of warfare and assisted by the U. S. Public Health Service and the International Health Board have created a board of strategy consisting of medical officers and sanitary engineers experienced in malaria control. But the fight against malaria in the South can not be won by a few experts and trained sanitarians alone. Every one who lives in the South and

every one who has business interests in the South must be enlisted in the cause. The people of the South must be educated in malaria, how it is transmitted and how it may be prevented, particularly those who have the least general education and least of this world's goods, because they are the very ones who are most sorely scourged. Malaria must be taught in the public schools, first in the country schools, both white and colored. Every practicing physician must be impressed with the importance of the after-treatment of malaria. He must be brought to see that his patient is not cured in three or four days although the chills and fever are broken, and that adequate quinin dosage should be continued for weeks or even months, both as a protection to the patient and to the public at large. The business men of the South must be shown the difference in output of malaria-infected and malaria-free employees, and how they may reasonably control malaria in and around their industrial plants. The economic importance of malaria must be preached before civic organizations, chambers of commerce, luncheon clubs, and similar groups of laymen. The people must be made to realize that the wealth of the South depends upon the health of its rural communities, and that with very few exceptions, the business prosperity of every Southern city is derived from agriculture. The social welfare worker and the moral uplifter must be interested in malaria control. How can we have red-blooded American citizens whose red cells are filled with malaria plasmodia?

Adhering to a definite and practical program with unity of purpose backed by popular demand, the South will do much toward malaria control within the next ten years. No outside agency, federal or private, can do this thing for us without our cooperation.

RESULTS IN THE TREATMENT OF MALARIA

A series of observations on the quinin treatment of malaria by Acton, Rennie and others, at Dagshai, India, during 1919, 1920 and 1921, is reported in six papers in the *Indian Journal of Medical Research** (Calcutta) for 1921.

To one who has waded through the various British reports, official and otherwise, of the results of different methods of treatment for the cure of malarial infection during the war, these papers, even if one does not accept all of their conclusions, are a relief. They have something definite to offer based upon definite data.

Dagshai is one of the "Hill Stations" of India. Anopheles are absent and it is free from indigenous malaria. There is, then, no reinfection of the patients. The men observed in the reports were patients, convalescent from malaria—many of them relapsing cases—sent up to Dagshai from the plains. Coming from military hospitals, each one brought his history sheet, giving, among other things, the species of parasite found in that hospital. All diagnoses had been made from blood examinations and all men had received quinin treatment before arrival at Dagshai.

The men on arrival were, as a rule, without fever. A blood examination was made of each on entrance and if it was negative he was placed under observation and was only given an iron tonic. This examination was repeated twice each week for eight weeks. If there was neither febrile nor parasitic relapse in that time and his physical condition was good, he was returned to duty as cured. If parasites were found, the species was noted and the patient placed under treat-

*Indian Journal of Medical Research, April, 1921, pp. 750, 774, 787 and 853.

ment. Eight weeks' freedom from fever and from parasites after quinin had been stopped was required for a return to duty as cured.

RELAPSES BY SPECIES OF PARASITE

Eight hundred and fifty-three men received, from a district in which tertian and aestivo-autumnal fevers were about evenly divided, placed under observation and only on iron tonic, gave:

(1) 444 relapses, tertian parasites;
4 relapses, mixed tertian and aestivo-autumnal;
9 relapses, aestivo-autumnal; and
396 no relapse in 8 weeks—"cured."
(2) 164 men of Duke of Wellington's Regiment, as above;
96 relapses, tertian;
0 relapse, aestivo-autumnal.
(3) 183 men, as above:
73 relapses, tertian, all placed upon quinin, but gave other relapses;
5 relapses, aestivo-autumnal—only crescents found. Three recovered without quinin, and 2 received quinin by mistake. No relapses.
(4) 102 men, convalescent tertian malaria (from the history sheet).
102 men, convalescent aestivo-autumnal malaria (history sheet).
76 relapses in the first lot, all tertian;
46 relapses in the second lot, all tertian; and
0 relapses of aestivo-autumnal.

There are other records, but these are sufficient to show the much greater occurrence of tertian in relapses.

It is upon data like the above that the doctrine of the mutation of species of malaria parasites has been based, a doctrine generally discredited, but which is held by some eminent men such as Laveran, Plehn, Seyforth and others. Our authors under consideration, however, reject this hypothesis, giving reasons for their stand, and accept in its stead that infections with the aestivo-autumnal parasites are much more vulnerable to quinin than those with tertian. They quote the well known findings of Ramsden, Lufkin, etc., on the fixation of quinin by the liver, brain and other solid tissues, from which it would be in stronger solution in the portal circulation than in the blood in any other part of the body; and also the old finding of David Thompson showing the "clumping" of aestivo-autumnal schizonts in the portal circulation, while the schizogony of the tertian parasites occurs to a much greater proportion in the general circulation. Obviously, then, a much larger proportion of sporulating aestivo-autumnal parasites are exposed to a high concentration of quinin (in the portal blood) than of the tertian parasites in the same (the most vulnerable) stage. In its essence, then, the former are much more accessible to quinin than the latter.

A few of their conclusions are given below for the cure of malarial infection. They show that

(1) Of the various methods of quinin administration the oral is the most practical for routine use and gives as good results as any of the others.

(2) The continuous oral administration is better than the intermittent.

(3) In malignant tertian infections, with a month's course of quinin treatment, a cure rate of over 90 per cent is obtained when the patient is removed from the chance of reinfection.

(4) In benign tertian infections, with every two months' course of quinin treatment, about 25 to 30 per cent of the cases are cured whether by a single or repeated course. They have observed this effect with five consecutive courses.

(5) The high cure rate in malignant tertian infections—i. e., 90 per cent—is dependent upon the high destructive rate of quinin on the young asexual parasite coupled with the easy accessibility of this drug to the bulk of the parasites while sporulating in the portal area. A cure is assured, provided the treatment is carried over eight to ten cycles (21 to 30 days).

(6) The low cure rate in benign tertian infections—i. e., 25 to 30 per cent—

is dependent not upon the low destructive rate of quinin on the asexual parasites, but upon the fact that schizogony occurs throughout the body and is not specially restricted to the portal area. Quinin, therefore, does not gain easy access to these young forms, and the cure or complete destruction is dependent upon pure chance.

The treatment referred to was usually, not always, 30 grains of quinin in solution per day by the mouth. A larger dose, frequently given, was in general not more efficient.

Apropos of the tertian parasite's escaping destruction, and thus causing relapse on account of not being accessible to quinin in sufficient concentration, the same position—that relapse after quinin treatment is due to parasites inaccessible to quinin rather than to their being "quinin-fast"—was taken by Dr. Henry R. Carter, Assistant Surgeon-General, U. S. Public Health Service, in a memorandum* published in the JOURNAL in May, 1914, using practically the same arguments as Acton and Rennie, except, of course, those based upon the observations of Ramsden, which had not then been made. In all fairness and in the most friendly spirit we would call attention to the priority of the views of Dr. Carter as published in the SOUTHERN MEDICAL JOURNAL eight years ago.

*Carter, H. R.: "Quinin-Fast Malarial Parasites: A Memorandum." Southern Medical Journal, Vol. VII, No. 5, 1914, pp. 369-370.

MORE ABOUT GROUP MEDICINE

Growth is Nature's method of progress. First the leaf, then the corn, next the full ear in the sheath, is the order of life and of medicine. As children we were taught on the basis of the old classical education that there are four learned professions whose followers were the lawyer, the teacher, the physician and the minister. These fundamental professions are rooted in the needs, the customs, the duties and the laws of all civilized peoples in the Pagan and Christian eras. Changes in the organization and relation of any of these professions are entered into slowly and with reluctance, and are permitted only after struggle with custom and the ceaseless demands of the actual needs of the common people.

In some such condition is the medicine of today. It is continually being uprooted from within by new discoveries in chemistry, physiology, bacteriology and pathology that in turn upheave therapeutic methods and technic. The output of instruments of precision continues as a result. The electrocardiograph, the instrument for the measurement of basal metabolism, and the spirometer in heart disease, are a few comparatively recent developments that have become necessities in medical centers. This is a medical age. The people themselves know the difference between superficial medicine and scientific medicine. No one man can any longer know very much medicine because there is so much medicine to know.

The base hospital in the World War comprised not only a group of specialists that functioned admirably, but it was the best illustration of the group idea over the widest area that the world has ever known. It was the Mayo Clinic idea in the Army, quickly assembled and made to function under military authority. The development of medicine, many fields of specialty, many specialists, new instruments of precision, the limitations of knowledge in the medical individual as contrasted with the breadth of medical knowledge, the efficiency of the base hospital idea, the demands of the people for concentrated scientific service—all these

tend to explain the increasing hold of the group idea and the increasing number of groups that are formed. The fundamental profession of medicine is gradually changing and the individual is going into associations called groups for the private practice of clinical medicine in all the specialties.

Groups vary in formation, size and relations. A group may be close or loose. By the former is meant a close financial relation as in a firm or corporation. By the latter that a few have a financial arrangement of this kind, and the referred work passes to others not dependent upon the primary group. For example, a small group may lack a dentist, and what dental work there is may be referred to one or more dentists, who look to the patient directly for recompense. Groups vary in size from a small group of two men with their assistants, clerks, etc., to the larger group of ten to two hundred doctors handling from a few to a few hundred patients daily. Groups may be complete or incomplete; complete in the sense that they include all specialties, and incomplete in the sense that only medicine and diagnosis is included and all surgical cases are referred, or that only surgical diagnosis and operations are considered and all medical cases are referred. A specialty group may be organized as an orthopedic clinic or an ear, nose and throat clinic.

One can neither understand a group nor explain a group unless one has lived in a group. It is a professional marriage of association, service and profits in the largest sense. It has advantages and disadvantages, dangers and conveniences, pitfalls and triumphs. It is exceedingly difficult in the larger cities. It is difficult if not impossible in locations where certain members have medical school positions and others have not. It is difficult if the group neither owns nor controls its hospital. It is doomed to failure in any individual case in the long run, if profit is put above service, superficiality above individuality, quantity above quality. Some men cannot work in a group. They are masters only in single harness. Some men can work only in a group. They are servants only in association.

The overhead expense of group practice is very high. The profits divide by long division. Selfishness, self-praise and jealousy are poisoned daggers in a group. Only congeniality, friendship and faith added to unbounded energy and enthusiasm promise endurance and triumph.

Too rapid growth is another supreme danger. Growth is necessary, otherwise there is a stagnation and failure; but too rapid growth increases the overhead, promotes idleness when work is slack, and discontent develops. Slowly should be the growth through the years from little finger to thumb by needs and stages and not a leap across the hand from little finger to the big thumb.

There are three articles in this issue of the JOURNAL on different phases of group medicine. Whether one is in a group or is interested in group medicine, the group is both a new idea and a new factor in medicine that is rapidly assuming larger proportions in social, financial and scientific relations. An idea is valuable only as it is efficient and group medicine will be tested by this law. We must stand by what is good in medicine, and make it better.

The practice of group medicine has spread rapidly. Its supreme test will be the kind and the cost of the service it renders sick people.

Correspondence

AN EXPLANATION

Editor, SOUTHERN MEDICAL JOURNAL:

In your issue for April, 1920, there appeared a report of an address delivered by me at the thirteenth annual meeting of the Southern Medical Association, held at Asheville, N. C., November 10-13, 1919.

I had returned from France but a short time before and this address was but an informal presentation of a collection of notes based upon excerpts from diaries kept during the period of my active service abroad.

One of these notes referred to the capture of samples of grouped blood from the British by the Germans. This note was read as it was written at the time of the occurrence but, as stated, is capable of misinterpretation and should have been deleted before the address was published, as it represented neither a thought nor an act on the part of any of my medical colleagues or of myself.

In order that such misinterpretation may be obviated, therefore, may I ask that this note be inserted in one of your forthcoming issues?

Very truly yours,
GEORGE W. CRILE, M.D.

Cleveland, Ohio, April 4, 1922.

[The above is in answer to a letter received by the JOURNAL and Dr. Crile from Prof. A. von Eiselsberg, Vienna, Austria, in reference to this statement: "To their (the British's) great regret, during an offensive the Germans captured a lot of this perfectly good blood. We always hoped that they would get the numbers wrong, so that if they used it, it would be improperly grouped and anaphylaxis would follow." Title of paper: "Surgical Researches During the World War", Southern Medical Journal, Vol xiii, No. 4, April 1920, p. 268.—EDITOR.]

Book Reviews

Pneumonia. Harvard Health Talks. By Fredick Taylor Lord, A.B., M.D., Visiting Physician, Massachusetts General Hospital. 69 pages. Cambridge: Harvard University Press, 1922.

This is one of a series of public lectures delivered at the Medical School of Harvard University.

It is very tersely written. Dr. Lord's position in the profession makes the information of value.

The binding and printing are excellent. It should prove a book of real use to those for whom it is written.

The Ten Commandments of Medical Ethics. By Frank B. Wynn, M.D. Reproduced from "The Physician." Artistically printed in colors and handsomely illuminated by an especially designed border illustrating the History of Medicine in Symbolism. Size 22x17—Suitable for framing. Indianapolis: F. E. Dillan, 1922. Price, postpaid, $2.00.

The above is quite descriptive of the contents of the "Commandments." They express lofty ideals and deal with the physician's obligations to his conscience and to the patient. It is well worded and the mechanical work is artistically executed.

Preventive Medicine and Hygiene. By Milton J. Rosenau, Professor of Preventive Medicine and Hygiene, Harvard; Director of the School of Public Health, Harvard University and Massachusetts Institute of Technology; Formerly Director, the Hygienic Laboratory, U. S. Public Health Service, etc. With chapters on Sewage and Garbage by George W. Whipple, Professor of Sanitary Engineering, Harvard University. Vital Statistics by John W. Trask, Assistant Surgeon-General, U. S. Public Health Service. Mental Hygiene, by Thomas W. Salmon, Medical Director, National Committee for Mental Hygiene, etc. Fourth edition. 1192 text figures and 1567 pages. New York and London: D. Appleton & Co., 1921.

Rosenau's "Preventive Medicine and Hygiene" is one of the standard works by American authors, and is one of the accepted authorities on the subject.

The fourth edition has undergone extensive revision and additions, the following subjects having been added: Public Health Methods and Measures; Relative Values in Public Health Work; A Public Health Program; Organization of Health Departments; Median Endemic Index; Housing; Rural Sanitation; Public Health Education; Public Health Nursing; Drug Addiction; Alcoholism; Undernutrition; Sanitary Surveys; Infant Mortality; Koch's Laws; Intelligence Quotient; Vitamins; Oral Hygiene; Ocular Hygiene; Personal Hygiene; and a Laboratory Course in Preventive Medicine and Hygiene. Also a discussion of the following diseases is taken up for the first time by the author: Vincent's Angina; Deer Fever; Leishmaniasis; Epidemic Encephalitis; Psychoneurosis; and War Edema.

The following sections have been rewritten: Venereal Diseases and Hygiene of Sex; Dysentery; Influenza; Trench Fever; Mental Defectives; Food Poisoning; Botulism; Deficiency Disease and Goiter.

The book is most complete. It should be in the library of every physician, as it gives facts in such a manner that they are readily obtainable for ready reference.

The Practical Medicine Series, comprising eight volumes on the year's progress in medicine and surgery. Series 1921. In eight volumes. Vol. II, **General Surgery.** Edited by Albert J. Ochsner, M.D., F.R.M.S., LL.D., F.A.C.S., Major, M.R.C.S., U. S. Army; Surgeon-in-Chief, Augustana and St. Mary of Nazareth Hospitals; Professor of Surgery, Medical Department, University of Illinois. Illustrated. 625 pages. Cloth, $2.50.

Vol. III, **The Eye, Ear, Nose and Throat.** Edited by Casey A. Wood, C.M., M.D., D.C.D., Albert H. Andrews, M.D., and George E. Shambaugh, M.D. Illustrated. 392 pages. Cloth, $1.75.

Vol. IV, **Pediatrics.** Edited by Isaac A. Abt, M.D., Professor of Pediatrics, Northwestern University Medical School; Attending Physician, Michael Reese Hospital, with the collaboration of Johanna Heumann, M.D. **Orthopedic Surgery.** Edited by Edwin W. Ryerson, M.D., Associate Professor of Surgery (Orthopedic), Rush Medical College; Professor of Orthopedic Surgery, Chicago Polyclinic; Attending Orthopedic Surgeon, Children's Memorial and Hewratin Hospitals; Consulting Orthopedic Surgeon, House for Destitute Crippled Children. With the collaboration of Robert O. Ritter, M.D., Associate Attending Orthopedic Surgeon, Children's Memorial Hospital, Chicago. Illustrated. 306 pages. Cloth, $1.75.

Vol. VI, **Pharmacology and Therapeutics.** Edited by Bernard Fantus, M.S., M.D., Associate Professor of Therapeutics, Rush Medical College. **Preventive Medicine.** Edited by Wm. A. Evans, M.S., M.D., LL.D., D.P.H., Professor of Sanitary Science, Northwestern University Medical School. With the collaboration of G. Koehler, M.D., Assistant Commissioner of Health, City of Chicago. Cloth, $1.75.

Chicago: The Year Book Publishers, 1921.

This series has long served a useful purpose in employing expert clinicians and teachers of medicine to summarize in a few words the most important contributions of the year in the several branches of the profession. While the individual volumes are of value to the specialist, their brevity makes an especial appeal to the general practitioner who in eight tiny volumes can procure a record of the "high points" in medicine during the past year.

Southern Medical News

ALABAMA

The organization meeting of the Alabama Pediatric Association was held in Birmingham at the Children's Hospital April 17. The following officers were elected: Dr. J. Ross Snyder, Birmingham, President; Dr. C. B. Bray, Birmingham. Vice-President; Dr. Jerome Meyer, Birmingham. Secretary-Treasurer; Drs. F. L. Salter, Anniston, S. H. Welch, Birmingham, J. R. Garber, Executive Committee.

The Alabama Baptist Hospital, Selma, was formally opened February 14.

A contract has been awarded for the construction of a new nurses' home for the Alabama Baptist Hospital, Selma. The building will cost $25,000.

The Baldwin County Medical Society held its regular quarterly meeting in Bay Minette April 4. The next meeting will be held in Foley.

A bronze bust of the late Dr. Jerome Cochran, founder of the Medical Association of the State of Alabama, has been placed at the entrance of the Health Department Building, Montgomery.

It is announced that Dr. B. B. Mitchell will soon establish a hospital for negroes in Tuscaloosa.

The Central Alabama Hospital, Clanton, completed at a cost of $30,000, was recently opened.

The Gorgas Memorial Campaign was initiated at a meeting held in Birmingham March 3.

Dr. Leon C. Havens, Johns Hopkins School of Public Health, Baltimore, has been appointed Director of the Alabama State Laboratory and Pasteur Institute, Montgomery.

Deaths

Dr. Thomas I. Conwell, Mobile, aged 40, was found dead in his office at Chickasaw, March 20.

Dr. Jesse Thomas Hancock, Oneonta, aged 80, was run over and killed by an L. & N. train at Oneonta March 29.

ARKANSAS

Ashley County Medical Society has elected the following officers: Dr. C. E. Spivey, President; Dr. J. W. Simpson, Vice-President; Dr. L. C. Barnes, Secretary-Treasurer.

Cleburne County Medical Society has elected the following officers: Dr. W. J. Hornbarger, President; Dr. J. T. Matthews, Secretary; Dr. S. A. Turner, Treasurer.

Chicot County Medical Society has elected the following officers: Dr. S. W. Douglas, Eudora, President; Dr. E. E. Barlow, Dermott, Vice-President; Dr. J. S. Wilson, Lake Village, Secretary.

Monroe County Medical Society has elected the following officers: Dr. C. H. McKnight, President; Dr. W. L. Boswell, Vice-President; Dr. J. H. Phipps, Secretary-Treasurer.

Randolph County Medical Society has elected the following officers: Dr. W. E. Hamil, President; Dr. R. R. Johnson, Vice-President; Dr. H. L. Throgmorton, Secretary-Treasurer.

Dr. J. M. McDavid has been appointed Health Officer of West Helena.

At the recent annual meeting of the Tri-State Medical Association held at Shreveport, the following officers were elected: Dr. J. N. White, Texarkana, President; Dr. John L. Scales, Shreveport, La., Vice-President for Louisiana; Dr. F. E. Baker, Stamps, Vice-President for Arkansas; Dr. J. K. Smith, Texarkana, Vice-President for Texas. Hot Springs will be the next meeting place.

Dr. W. H. Bollings will build a hospital in Ozark. It will be a modern brick structure.

Deaths

Dr. L. H. Hall, Pocahontas, aged 55, died February 20.

Dr. Benjamin F. Chiles, Pecan Point, aged 64, died March 25.

DISTRICT OF COLUMBIA

The American Pediatric Society will meet at Wardman Park Hotel, Washington, May 1-3.

Senator Phipps, Colorado, has introduced a bill in Congress providing for the construction of a building for the care of tuberculous pupils of the public schools of the District of Columbia. The building will cost $150,000.

The District of Columbia branch of the Society of American Bacteriologists has elected the following officers: Col. H. J. Nichols, of the Army Medical School, Chairman; Capt. C. S. Butler, Commandant of the Naval Medical School, Vice-Chairman; Miss Alice C. Evans, of the Hygiene Laboratory, U. S. Public Health Service, Secretary-Treasurer.

Dr. J. H. Neall, formerly of Washington, and Mrs. Mamie Wilde Paulson were married in Washington December 12.

Deaths

Dr. Louis Kelley Beatty, Washington, aged 65, died March 11.

FLORIDA

The Duval County Medical Society will have an annual clinic week to which the doctors of Florida and south Georgia are to be invited. The Publicity Committee is in charge of arrangements, which are being made for the clinic this year to be held in the hospitals of Jacksonville on June 7-10. The Committee is composed of Drs. A. H. Freeman and Clayton Washburn, St. James Building, and C. J. Lewis, South Jacksonville.

The State Board of Health recently consolidated the Bureau of Venereal Disease with several activities heretofore carried on by other bureaus into the Bureau of Communicable Diseases, with Dr. George A. Dame as Director. Dr. Dame previously served as Director of the Bureau of Venereal Diseases. The divisions of the new Bureau are: Field Service, consisting of the District Health Officers, Venereal Disease Control, County Health Work and Epidemiology.

The State Board of Health, cooperating with the International Health Board, has recently completed a hookworm survey of eight counties. The Bureau of Child Welfare of the State Board of Health will use the data collected for campaign work, educational and treatment.

Dr. F. A. Brink, District Health Officer in West Florida, recently carried on an active campaign against typhoid fever in Escambia County.

The Polk County Medical Society has elected the following officers: Dr. Frank E. Irons, Winter Haven, President; Dr. Herman Watson, Lakeland, Secretary.

Deaths

Dr. James Monroe Carswell, Jacksonville, aged 51, died January 30.

Dr. Frank Brady, Leesburg, aged 41, died March 16 from uremia.

Dr. I. T. Law, Arcadia, was recently electrocuted in his office while making an x-ray examination of the fractured arm of a patient.

GEORGIA

The Bartow County Physicians' Credit Association has been organized by the physicians of Bartow County.

Alumni week of Emory University, the Institute-Clinic on Venereal Diseases and the Conference of the District, County and City Health Officers will open at Emory University June 5 and continue through the week. Various departments of public health of the adjoining states have been invited.

It has been announced that the new addition to the Piedmont Sanatorium will open soon. The Sanatorium occupies one-half block facing on Capitol Avenue.

Dr. Andrew L. West, Athens, has resigned as City Physician.

Dr. Cheston King, Atlanta, has purchased several buildings at Stone Mountain, which he is having converted into a sanitarium for nervous and mental diseases, and he expects to have it ready for occupancy in the summer.

The new hospital at Sycamore was formally opened in January. Drs. John T. Moore and Warren A. Harrison are in charge of the institution.

Bartow County Medical Society has elected the following officers: Dr. G. W. Battle, Cassville, President; Dr. R. E. Wilson, Cartersville, Vice-President; Dr. Howard E. Felton, Cartersville, Secretary-Treasurer.

Bibb County Medical Society has elected the following officers: Dr. J. P. Holmes, Macon, President; Dr. W. E.

Mobley, Macon, Vice-President; Dr. O. L. Spivey, Macon, Secretary-Treasurer.

Brooks County Medical Society has elected the following officers: Dr. E. L. Jelks, Quitman, President; Dr. A. J. Smith, Quitman, Secretary-Treasurer.

Butts County Medical Society has elected the following officers: Dr. A. F. White, Flovilla, President; Dr. B. F. Akin, Jenkinsburg, Vice-President; Dr. J. L. Byron, Jackson, Secretary-Treasurer.

Coweta County Medical Society has elected the following officers: Dr. J. B. Peniston, Newnan, President; Dr. M. H. Farmer, Newnan, Secretary-Treasurer.

Crisp County Medical Society has elected the following officers: Dr. M. B. Smith, Cordele, President; Dr. G. M. D. Hunt, Cordele, Vice-President; Dr. R. L. Williams, Cordele, Secretary-Treasurer.

Decatur-Seminole County Medical Society has elected the following officers: Dr. Gordon Chason, Bainbridge, President; Dr. J. I. Spooner, Donaldsonville, Vice-President; Dr. P. M. Lewis, Secretary-Treasurer.

Dooly County Medical Society has elected the following officers: Dr. R. H. Pate, Unadilla, President; Dr. J. L. Lee, Pinehurst, Vice-President; Dr. L. H. Bishop, Unadilla, Secretary-Treasurer.

Gordon County Medical Society has elected the following officers: Dr. J. M. Erwin, Calhoun, President; Dr. W. R. Richards, Calhoun, Vice-President; Dr. Z. V. Johnston, Calhoun, Secretary-Treasurer.

Hart County Medical Society has elected the following officers: Dr. W. E. McCurry, Hartwell, President; Dr. George S. Clarke, Hartwell, Secretary-Treasurer.

Henry County Medical Society has elected the following officers: Dr. H. C. Ellis, McDonough, President; Dr. W. A. Williams, McDonough, Secretary-Treasurer.

Irwin County Medical Society has elected the following officers: Dr. H. P. Lyons, Mystic, President; Dr. R. F. McLeod, Ocilla, Vice-President; Dr. L. B. Whiddon, Ocilla, Secretary-Treasurer.

Johnson County Medical Society has elected the following officers: Dr. T. L. Harris, Wrightsville, President; Dr. S. M. Johnson, Wrightsville, Vice-President; Dr. R. E. Brinson, Wrightsville, Secretary-Treasurer.

Lafayette County Medical Society has elected the following officers: Dr. W. E. Brown, Lafayette, President; Dr. R. M. Coulter, Lafayette, Vice-President; Dr. D. W. Hammond, Lafayette, Secretary-Treasurer.

Lowndes County Medical Society has elected the following officers: Dr. J. M. Smith, Valdosta, President; Dr. G. T. Glazier, Valdosta, Vice-President; Dr. T. H. Smith, Valdosta, Secretary-Treasurer.

Meriwether County Medical Society has elected the following officers: Dr. J. A. Johnson, Manchester, President; Dr. J. L. Dixon, Woodbury, Vice-President; Dr. Frank Norman, Greenville, Secretary-Treasurer.

Morgan County Medical Society has elected the following officers: Dr. A. K. Bell, Madison, President; Dr. J. M. Prior, Apalachee, Vice-President; Dr. J. H. Nicholson, Madison, Secretary-Treasurer.

Ocmulgee County Medical Society has elected the following officers: Dr. J. H. Hendrix, Hawkinsville, President; Dr. W. H. Pirkle, Cochran, Secretary-Treasurer.

Taliaferro County Medical Society has elected the following officers: Dr. A. H. Beazley, Crawfordville, President; Dr. O. F. Portwood, Crawfordville, Vice-President; Dr. John A. Rhodes, Crawfordville, Secretary-Treasurer.

Turner County Medical Society has elected the following officers: Dr. J. T. Moore, Sycamore, President; Dr. D. P. Luke, Ashburn, Vice-President; Dr. W. A. Harrison, Sycamore, Secretary-Treasurer.

Walton County Medical Society has elected the following officers: Dr. H. L. Upshaw, Social Circle, President; Dr. J. B. H. Day, Social Circle, Vice-President; Dr. J. K. McClintic, Monroe, Secretary-Treasurer.

Warren County Medical Society has elected the following officers: Dr. F. B. Ricketson, Warrenton, President; Dr. F. L. Ware, Warrenton, Vice-President; Dr. A. W. Davis, Warrenton, Secretary-Treasurer.

Whitfield County Medical Society has elected the following officers: Dr. H. L. Erwin, Dalton, President; Dr. H. J. Ault, Dalton, Vice-President; Dr. B. L. Kennedy, Dalton, Secretary-Treasurer.

Worth County Medical Society has elected the following officers: Dr. J. L. Tracey, Sylvester, President; Dr. W. J. Hall, Oakfield, Vice-President; Dr. W. C. Tipton, Secretary-Treasurer.

Dr. Samuel Kahn, Atlanta, and Miss Ruth M. Levine, New York, N. Y., were married March 18.

Deaths

Dr. W. D. Vinson, Atlanta, aged 65, died March 30.

Dr. James N. Roland, Chester, aged 42, died February 9.

Dr. Thomas T. Key, Norcross, aged 87, died March 23.

Dr. Marit F. Nelms, Commerce, aged 50, died February 16 at the Wesley Memorial Hospital, Atlanta, from spinal meningitis.

Dr. W. D. Jennings, Augusta, died February 28 from pneumonia.

Dr. Frank A. Story, Lafayette, aged 68, died January 15 at West Armuchee from chronic nephritis.

KENTUCKY

Allen County Medical Society has elected the following officers: Dr. E. A. Whitlow, re-elected President; Dr. J. E. Pace, Secretary.

Bell County Medical Society has elected the following officers: Dr. O. P. Nuckols, President; Dr. Jacob Schultz, Vice-President; Dr. J. G. Foley, Secretary.

Cumberland County Medical Society has elected the following officers: Dr. J. E. Bow, President; Dr. J. R. Webb, Vice-President; Dr. W. C. Keen, Secretary-Treasurer.

Daviess County Medical Society has elected the following officers: Dr. P. D. Gillim, President; Dr. A. J. Gordon, Vice-President; Dr. J. J. Rodman, Secretary-Treasurer.

Lyon County Medical Society has elected the following officers: Dr. J. H. Hussey, President; Dr. T. L. Phillips, Vice-President; Dr. W. G. Kingsolving, Secretary-Treasurer.

Franklin County Medical Society has elected the following officers: Dr. G. A. Budd, President; Dr. W. H. Evans, Vice-President; Dr. F. W. Mastin, Secretary-Treasurer.

McCreary County Medical Society has elected the following officers: Dr. C. E. Carr, President; Dr. F. E. Peck, Vice-President; Dr. R. M. Smith, Secretary-Treasurer.

Russell County Medical Society has elected the following officers: Dr. H. S. Gehrken, President; Dr. J. B. Tartar, Vice-President; Dr. J. B. Scholl, Secretary-Treasurer.

Shelby County Medical Society has elected the following officers: Dr. A. C. Weakley, President; Dr. W. P. Forman, Vice-President; Dr. Vernon R. Jones, Secretary-Treasurer.

Knox County Medical Society has elected the following officers: Dr. Leslie Logan, President; Dr. John G. Tye, Vice-President; Dr. Frank R. Burton, Secretary-Treasurer.

A recent fire at the U. S. Veterans' Hospital, Princeton, caused damage estimated at $14,000.

Plans are being made by the Sue Bennett Memorial School, London, to erect a new infirmary at a cost of $50,000.

The fiscal court recently appropriated $4,250 to the Health and Welfare League in Fulton County for use in the full-time health department.

Dr. Edward D. King, Covington, and Miss Genevieve Stuart Race, Cincinnati, were married February 22.

Deaths

Dr. Henry David Peterson, Millersburg, aged 67, died February 21.

Dr. Albert Algernon Marrett, Constance, aged 77, died March 1 at St. Elizabeth's Hospital, Covington.

Dr. Henry D. Wells, Middleburg, aged 92, died Febuary 25 from senility.

Dr. H. Tod Smiser, Cynthiana, aged 45, died March 4 at Phoenix, Ariz., from tuberculosis.

Dr. Charles Brookover, Louisville, aged 52, died March 17 after an extended illness.

Dr. Everett T. Almon, Morton's Gap, aged 71, died March 29.

LOUISIANA

The Seventh Congressional District Medical Society, suspended during the war, was recently reorganized. The following officers were elected: Dr. Norman S. Craig, Jennings, President; Dr. Sylvan Wolff, Opelousas, Vice-President; Dr. A. H. Morgan, Secretary-Treasurer.

The site has been purchased for the new $2,000,000 Baptist Hospital, New Orleans.

The Jefferson Parish Board of Health was reorganized March 8. The following are members of the Board: Dr. Marvin M. Odom, McDonoghville, and Dr. Joseph S. Koppfler, Kenner.

Tulane University, New Orleans, is planning to construct a 300-bed hospital.

The Charity Hospital, New Orleans, plans to have a three-story addition to the Clinic Building at a cost of $84,000.

It has been announced that a new building to cost $50,000 will soon be added to the group of buildings on Tulane Campus.

The following have been appointed members of the Lafourche Board of Health: Dr. Hubert S. Smith, Dr. Albert J. Meyer and Dr. Frank T. Gouaux.

(Continued on page 38)

"Massage alcohols" usually leave a heavy, unpleasant odor, due to the denaturant used.

"ALKOLAVE S&D"—the *quality* rubbing alcohol—leaves a refreshingly pleasant odor; it is denatured differently; by special process.

Use it clear or diluted; but only of course on unbroken skin surfaces—never on mucosa and never internally.

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The satisfactory results, judged from your own and your patients' viewpoint, justifies our pride in this product.

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(Continued from page 430)

Dr. Edwin E. Evans, formerly with the East Louisiana Hospital for the Insane, has been appointed superintendent of an institution to be built at Pineville for the state colony and training school for the feeble-minded. The hospital will accommodate 2,000 patients.

The Child Welfare Association has announced an adult nursing service as well as a visiting nurse service for children as an aid to physicians of Orleans Parish in their charity and semi-charity practice.

The following have been appointed members of the Point Coupee Board of Health: Dr. Robert McG. Carruth and Dr. Maril O. Becnel, New Roads, and Dr. August B. Lacour, Batchelor.

As a response to a plea of W. M. Danner, Secretary of the U. S. Leper Commission and of the American Missions to Lepers, the Louisiana Committee of the International Leper Society was formed in New Orleans recently.

Deaths

Dr. Milton A. Henry, Saline, aged 79, died March 1 from senility.

MARYLAND

The annual meeting of the Maryland Branch, National Tuberculosis Association, was held in Baltimore March 16.

In commemoration of the second anniversary of their connection with the University Hospital, Baltimore, the Red Cross volunteer aides have presented equipment valued at $3,715.84 to the institution.

The Virginia Baptist Hospital, Lynchburg, has requested Dr. Winford H. Smith, Superintendent of the Johns Hopkins Hospital, to be Consulting Director of a 200-bed, three-unit hospital soon to be erected outside of Lynchburg.

An anonymous donor has promised Johns Hopkins Hospital $3,000,000 on condition that Johns Hopkins University raises an additional $1,000,000.

Johns Hopkins University, Baltimore, has announced increases in tuition fees for the next academic year for its medical department, the summer school and college courses for teachers. Beginning October, the tuition at the medical school will be $300 a year instead of $250; the tuition fee for the 1922 session of the summer school will be raised from $30 to $35 for two or three courses; additional courses will cost $14 instead of $12; the fee for a single course is raised from $20 to $22; an additional fee of $3.00 is set for late registration.

A contract has been awarded for a new $40,000 two-story infirmary at Rosewood Institute, Owings Mills.

The new Union Memorial Hospital, Baltimore, will cost approximately $1,000,000.

Dr. Clayton C. Campbell, Chief of the medical Service, U. S. Veterans' Bureau Hospital No. 56, Fort McHenry, has been ordered to Veterans' Bureau Hospital No. 52 at Boise City, Idaho, and Dr. Sherwood Dix has been transferred to Veterans' Bureau Hospital No. 72, Helena, Mont.

Dr. Frank Gordon, Commandant at U. S. Veterans' Bureau Hospital No. 56, Fort McHenry, has been ordered to the Veterans' Bureau Hospital at Portland, Oregon.

Plans are being made to build a new nurses' home for the Eudowood Sanatorium, Towson. The building will cost approximately $25,000.

A nurses' home will be erected at the University of Maryland, Baltimore, at a cost of $300,000.

Plans are being made for the erection of a new $750,000 municipal hospital at Baltimore in the Hillen Road section.

On April 1 the National Dental Association, at Baltimore, gave a dinner to Dr. William S. Halsted, Professor of Surgery at the Johns Hopkins Medical School and Surgeon-in-Chief of the Johns Hopkins Hospital. The Association presented him with a handsome medal in recognition of his service to the medical profession and humanity as discoverer of the modern method in neuroregional anesthesia.

Dr. D. Z. Dunott, Baltimore, Chief Surgeon of the Western Maryland Railway Company, was selected as one of the delegates from the American Railway Association to attend the International Railroad Congress at Rome, Italy, in April. Before the convention opened Dr. Dunott studied sanitary and surgical conditions as affecting railroads in England.

Dr. F. Leslie Jennings, Baltimore, and Miss Hazel May Baer, Waynesboro, were married at Chester, Pa., February 27.

(Continued on page 40)

Laboratories of

Drs. Bunce, Landham and Klugh

ATLANTA, GEORGIA

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These laboratories are equipped for making every test of clinical value in the diagnostic study of medical and surgical cases. Only standardized methods and technique are used.

In addition to the diagnostic study of cases there are adequate facilities for the x-ray and radium treatment of conditions in which these forms of treatment are indicated.

Fee lists and containers for pathological specimens and information in reference to x-ray and radium work furnished upon request.

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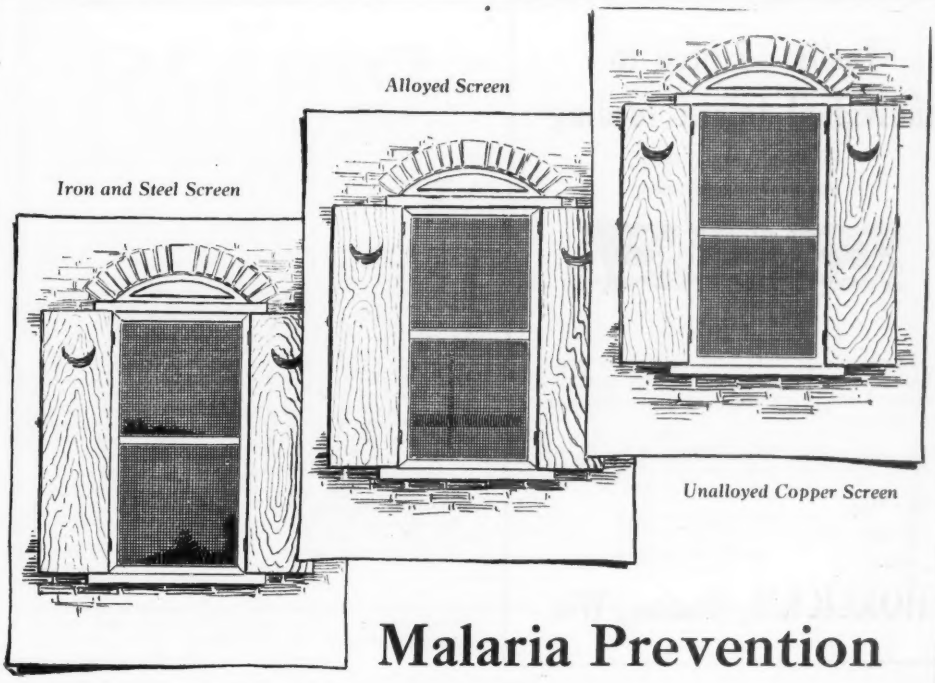

Malaria Prevention

In the prevention of malaria every physician realizes the importance of proper screens for residences, office buildings, hospitals, schools—any building where people work or live.

Your recommendation regarding the insect screen cloth to be used in the fight against malaria carries much weight. You should bear these facts in mind, then.

Material

Insect screen cloth of pure high grade copper, produced by the Roebling process, cannot rust, and is unusually stiff and strong. Every wire is of the same high quality as every other one, and will give the same long years of service. Under like conditions it will outlast any of the other metals by many years. Screen cloth of iron or steel, for example, rusts out in patches and screens of alloy are of uneven quality, some of the wires disintegrating before others.

Mesh

16 mesh is rapidly becoming the standard in this country. The United States Public Health Service does not approve of the use of wire cloth coarser than this.

Jersey Copper Screen Cloth is made of copper 99.8% pure. It is produced in the Roebling works by a special process which insures its giving unequalled service under the severest climatic conditions. On request we will gladly send you a book, "A Matter of Health and Comfort", which explains more fully the advantages of using pure copper wire for screens.

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HORLICK'S, Racine, Wis.

(Continued from page 38)

Deaths

Dr. Bennett Bernard Browne, Baltimore, aged 79, died March 10 from senility.

Dr. Jacob Jones Wilson, Cumberland, aged 73, died February 24.

Dr. Edward N. Crawford, Cecilton, aged 70, died March 4 from appendicitis.

Dr. Franklin H. Erb, Baltimore, aged 60, died February 28 from septicemia and acute articular rheumatism.

Dr. Silas W. Hunter, Wiseburg, aged 72, died January 19 at the Mercy Hospital, Baltimore, from carcinoma of the stomach.

MISSISSIPPI

At a recent meeting of the Clarksdale and Six Counties Medical Association a resolution was introduced calling for the dissolution of the Clarksdale and Six Counties Medical Association and the merging of this Association with the medical societies of Humphreys, Leflore and Washington Counties, and to be known as the Delta Medical Association. The resolution will have final consideration in November.

Dr. J. W. Dugger announces opening of his office at Amory, being associated with Dr. C. B. Baker, D.D.S.

A bill for the appropriation of $134,000 per annum to the State Board of Health for emergency expenses, the eradication of malaria, pellagra and hookworm has passed the House. It will be used as follows: Hygienic laboratories, $20,000 per year; vital statistics, $12,000; rural sanitation, $30,000; child welfare work, $30,000.

Deaths

Dr. Jesse Alfred Nash, Plantersville, aged 39, died recently from appendicitis.

Dr. Thomas Meriwether Jones, Hernando, aged 76, died March 15.

Dr. Norvin Earl Greene, Victoria, aged 39, died March 22.

MISSOURI

Dr. E. C. Ernst, St. Louis, was elected President of the Central Section of the American Roentgen Ray Society at a meeting recently held in Chicago.

(Continued on page 42)

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(Continued from page 40)

The St. Louis Clinics recently established a junior membership with dues at $10 per year, limited to men who have been graduated five years or less and who desire to list their clinics, and in conjunction with the local Committee of Arrangements of the American Medical Association will hold a special clinic week May 18-23.

The American Proctologic Society will hold its next annual meeting at St. Louis May 22-23.

St. Francois County Medical Society has elected the following officers: Dr. Edgar E. Whiteside, Elvins, President; Dr. G. W. Gale, Bismarck, Vice-President; Dr. G. E. Cecil, Flat River, re-elected Secretary.

Cape Girardeau County Medical Society has elected the following officers: Dr. J. D. Porterfield, Jr., Cape Girardeau, President; Dr. Dayton Seabaugh, Millersville, Vice-President; Dr. W. E. Yount, Cape Girardeau, Secretary; Dr. W. N. Howard, Cape Girardeau, Treasurer.

Davies County Medical Society has elected the following officers: Dr. J. D. Dunham, President; Dr. M. A. Smith, Secretary-Treasurer; Dr. T. E. Cooper, First Vice-President; Dr. Frank Hedges, Second Vice-President.

A prize of $10 has been offered to the member of the Jackson County Medical Society who supplies the best answer to the questions: "Why should every ethical physician in Jackson County be a member of the Jackson County Medical Society? Why am I, an ethical physician, a member of the Jackson County Medical Society?" The answers shall be used for propaganda to attract new members to the society.

A seventy-four-room hospital will soon be erected at Excelsior Springs.

An ordinance has been introduced in the Board of Aldermen, St. Louis, providing for the sale of impounded dogs to the recognized medical schools in St. Louis to be used in the scientific teaching of medicine. Seventy-five cents will be charged for each dog delivered to the schools.

Physicians in Independence are planning to establish a county hospital for Jackson County. The amount of bonds to be voted will be $500,000.

Dr. Wm. McK. Marriot, St. Louis, has been appointed a member of the editorial staff of the American Journal of Children's Diseases and Dr. Evarts Graham, St. Louis, a member of the editorial staff of the Archives of Surgery.

Dr. A. L. Korn has been employed as pathologist for St. John's Hospital, Joplin.

Dr. A. C. Vickrey, St. Louis, has been appointed Superintendent of State Hospital No. 2, St. Joseph, succeeding Dr. P. E. Williams, who has been transferred to the Missouri State Hospital No. 3, Nevada.

Dr. A. B. Clark has been appointed as Registrar of Vital Statistics for Joplin.

Plans are being completed for a new two-story brick hospital building at Missouri State Sanatorium, Mt. Vernon, at a cost of $79,000.

Dr. David H. Dolley, Professor of Pathology, University of Missouri, has been appointed Director and Professor of Pathology in the St. Louis University School of Medicine.

A meeting of the American Association for the Study of the Feeble-minded will be held in St. Louis May 18-20.

Deaths

Dr. Augustus H. Schott, St. Louis, aged 72, died February 23 from pneumonia.

Dr. William C. McDowell, Springfield, aged 66, died March 20.

Dr. Eliza Markell Mitchell, Kansas City, died January 31.

Dr. Elmira Hertig, Blue Springs, aged 70, died March 10 from cerebral hemorrhage.

Dr. Ulysses Grant Strieby, Brownington, aged 56, died recently from pneumonia.

Dr. Francis E. Hinch, St. Genevieve, aged 65, died January 17 in a hospital at St. Louis.

NORTH CAROLINA

Under the direction of the Charlotte Cooperative Nursing Association, with the assistance of Drs. Yates Faison, Myers Hunter and John R. Ashe, a baby-feeding station has been established at Charlotte, where babies will be given expert attention.

A twenty-two-bed hospital will be built at Asheville to be known as the Blue Ridge Hospital for Negroes.

Johnson County Medical Society has elected the following officers: Dr. Carl V. Tyner, Smithfield, President; Dr. John H. Fitzgerald, Smithfield, Secretary-Treasurer.

The Elizabeth City Hospital, formerly under the direction of the U. S. Navy, has changed its name to Pasquotank Municipal Hospital and will be operated as a community hospital.

(Continued on page 44)

CALCREOSE

IN inflammations of the respiratory apparatus, especially in *bronchitis, Calcreose* has won a place in the therapeutic armamentarium of the physician. It is of value in the treatment of bronchitis associated with *pulmonary tuberculosis,* because it has creosote effect without untoward action on the stomach, such as nausea, disagreeable eructations and distress.

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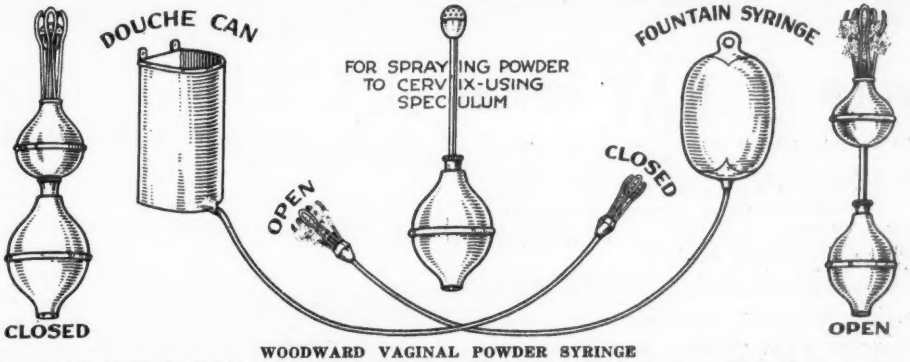

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a formula containing in addition to these two named ingredients Bismuth Subnitrate, Aluminum Asetate and Copper Citrate (small amount). This name was suggested by the Council on Pharmacy and Chemistry of the American Medical Association. We offer this Powder to the Profession because of its worth and efficiency as a dry antiseptic dusting powder.

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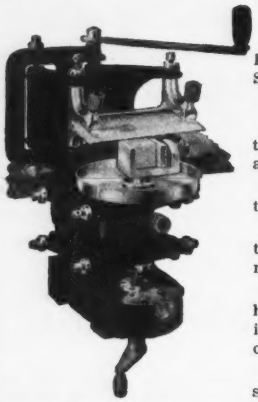

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(Continued from page 42)

The three new buildings to be erected at the State Hospital for the Insane, Morganton, will cost $103,000.

Deaths

Dr. Joseph Simpson Wise, Lincolnton, aged 53, died March 12.

OKLAHOMA

Vinita State Hospital recently opened its new $100,000 hospital addition.

Recently there developed several cases of smallpox in the jail at Poteau, nine of which died between January 3 and 13.

Plans are being drawn for a new three-story City Hospital for Negroes at Okmulgee at an approximate cost of $50,000.

A new $200,000 hospital will be erected for Oklahoma County.

Plans are being made to enlarge and remodel the Okmulgee City Hospital at a cost of $100,000.

The Oklahoma Association of Laboratory Workers has changed its name to the State Serological Association in order that technicians and laboratory workers who are not physicians may be eligible for membership. The following have been elected officers: Mr. L. E. Woods, Enid, President; Dr. William H. Bailey, Oklahoma City, Vice-President.

Dr. Charles William Heitzman and Mrs. Hane Gray Thomas, Muskogee, were married in San Antonio February 7.

Deaths

Dr. K. L. Colley, Barnsdall, died January 27.

Dr. J. M. Moore, Grove, died recently.

Dr. William C. Pendergraft, Hollis, aged 56, died February 20, following a long illness.

Dr. John Everett Booth, Daisy, aged 43, died February 9 from cerebral hemorrhage.

SOUTH CAROLINA

Dr. John W. Dupree, Simpsonville, has been appointed a member of the City Board of Health.

The Charleston County Tuberculosis Association has obtained the old Government remount station, near Charleston, as a temporary place to house more advanced tuberculosis patients.

Dr. Jesse W. Bell, Walhalla, has been elected a member of the City Board of Health.

Deaths

Dr. Frank Kennedy Holman, Sumter, aged 46, died February 23.

Dr. William Lawrence Mauldin, Jr., Greenville, aged 43, died March 3.

Dr. Alonzo E. Clough, Madison, died February 26.

Dr. Joseph Evans Brunson, Ninety-Six, aged 72, died February 20.

Dr. William Virginius Brockinton, Kingstree, died March 9.

Dr. James Woods Babcock, Columbia, aged 66, died March 4.

Dr. James Jeter Glenn, York, aged 34, died March 1 from pneumonia.

TENNESSEE

Dickson County Medical Society has elected the following officers: Dr. Hartwell Weaver, President; Dr. C. M. Lovell, Vice-President; Dr. W. J. Sugg, Secretary.

Putnam County Medical Society has elected the following officers: Dr. L. M. Freeman, Granville, President; Dr. L. S. Love, Silver Point, First Vice-President; Dr. Samuel Denton, Buffalo Valley, Second Vice-President; Dr. Lex Dyer, Cookeville, Secretary-Treasurer.

Obion County Medical Society has elected the following officers: Dr. J. D. Carlton, President; Dr. M. L. Smith, Vice-President; Dr. Ira Park, Secretary-Treasurer.

The Tennessee State Medical Association met in Memphis April 11-13. The following officers were elected: Dr. H. M. Tigert, Nashville, President; Dr. Frank A. Jones, Memphis, Vice-President; Dr. Larkin Smith, Nashville, Secretary-Editor; Dr. J. T. Gallagher, Nashville, Treasurer.

At a recent meeting of the Tennessee Anti-Tuberculosis League the following officers were elected: Mr. Henry Teitlebaum, Nashville, President; Mr. Bolten Smith, Vice-President; Mrs. C. D. Sullivan, Nashville, Secretary; Mr. John Stagmaier, Chattanooga, Treasurer.

Dr. R. Q. Lillard, Lebanon, has been elected Secretary and Executive Officer of the State Board of Health, succeeding Dr. Olin West.

The National Academy of Medicine and the Davidson County Medical Society gave a farewell banquet March 29 in honor of Dr. Olin West, Secretary of the State Board of Health, Editor of the Journal of the Tennessee State

(Continued on page 46)

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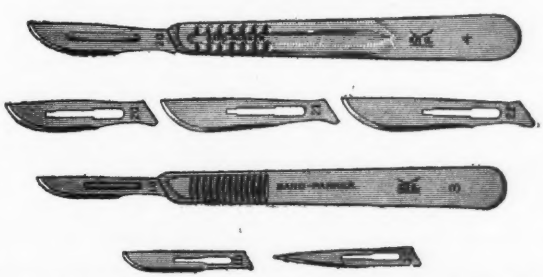

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(Continued from page 44)

Medical Association and Secretary of the Tennessee State Medical Society. Dr. West resigned to become Field Secretary of the American Medical Association.

Announcement of the formation of a partnership to be known as the Memphis Children's Clinic, permanent home to be erected at once, has been made. Dr. Edward Clay Mitchell, Dr. Eugene Rosamond and Dr. Walker L. Rucks will form the clinic.

Deaths

Dr. B. F. Brown, Jefferson City, aged 73, died March 12.

Dr. Roy Boyd Harrison, Nashville, aged 25, died March 3 from pneumonia.

Dr. John D. McKenzie, McKenzie, aged 78, died March 1.

Dr. John D. Slayden, Clarksville, aged 81, died March 24.

Dr. William Kilton Lackey, Ripley, aged 67, died suddenly March 25.

TEXAS

Jones County Medical Society has elected the following officers: Dr. W. J. McCreight, Anson, President; Dr. F. E. Hudson, Stamford, Vice-President; Dr. A. McK. Jones, Anson, Secretary.

LaSalle-Frio County Medical Society has elected the following officers: Dr. E. M. Howard, Pearsall, President; Dr. B. E. Pickett, Big Wells, Vice-President; Dr. R. L. Graham, Cotulla, Secretary-Treasurer.

Jim Wells and Kleberg County Medical Societies held a joint session at Alice March 10. Jim Wells County Society elected the following officers: Dr. L. P. Strayhorn, Falfurrias, President; Dr. M. J. Perkins, Alice, Secretary.

The Harris Memorial Methodist Hospital, Fort Worth, will soon be completed. It has a capacity of 400 beds and will cost approximately $1,000,000.

Woodlawn Hospital, Dallas, for the treatment of tuberculous negroes, will be enlarged. The building will cost $6,000 and will be erected jointly by the city and county.

A bond issue of $25,000 has been approved for the erection of a city hospital at Teague.

A new Methodist hospital will be erected at Oak Cliff.

The League of Texas Municipalities will hold its tenth annual meeting at Waxahachie May 17-18.

The El Paso Masonic Hospital Association has been organized at El Paso for the purpose of financing the purchase of a hospital building.

The Dallas Monthly Clinic, inaugurated in February, had its second meeting March 23. Dr. Carroll Allen, Tulane University, New Orleans, was the guest of honor.

The new addition to Parkland Hospital, to cost $300,000, has been started.

Dr. Edgar W. Loomis and Miss Addie Jane Walker, both of Dallas, were married March 15.

Deaths

Dr. Francis Charles Fleockinger, Taylor, aged 48, died March 6 from cerebral hemorrhage.

Dr. Benjamin F. Calhoun, Beaumont, aged 73, died recently.

Dr. Elannus R. Birch, Denison, aged 71, died February 27.

Dr. Ralph E. Conger, China Spring, aged 58, died March 1 from heart disease.

Dr. William Haynie, Buffalo, aged 79, died March 8.

Dr. Benjamin J. French, Waco, aged 68, died March 4.

Dr. John F. Butler, Wylie, aged 85, died March 11.

Dr. William T. Williams, Teague, aged 80, died February 17.

Dr. William Thomas Reeve, Boerne, aged 67, died February 19.

Dr. Frank B. Wilkes, Houston, aged 61, died March 12.

Mrs. Margaret Helena McDonald, owner and manager of the Rolston Hospital, Five Points, died in February, after a brief illness.

(Continued on page 48)

CLASSIFIED ADVERTISEMENTS

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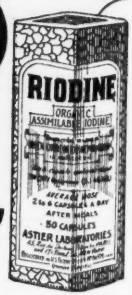

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(Continued from page 46)

VIRGINIA

Alleghany County Medical Society has elected the following officers: Dr. B. B. McCutchan, Clifton Forge, President; Dr. J. A. Riffe, Covington, Vice-President; Dr. Wm. P. Gilmer, Clifton Forge, Secretary; Dr. W. M. Revercomb, Clifton Forge, Treasurer.

Pittsylvania County Medical Society has elected the following officers: Dr. C. L. Bailey, Danville, President; Dr. J. J. Neal, Danville, Secretary.

The Tri-State Medical Association of the Carolinas and Virginia met in Norfolk February 22-23. The following officers were elected: Dr. S. S. Gale, Roanoke, Va., President; Dr. James K. Hall, Richmond, re-elected Secretary-Treasurer; Drs. W. E. Driver, Norfolk, R. B. Epting, Greenwood, S. C., and I. P. Battle, Rocky Mount, N. C., Vice-Presidents. High Point, N. C., was selected as the meeting place for 1923.

Dr. Dean B. Cole has resigned as head of the tuberculosis department of the Richmond Health Bureau.

The annual meeting of the McGuire Unit, designated as Base Hospital No. 45, was held February 28. Dr. Carrington Williams, Richmond, was elected Vice-Commander; Drs. Fred M. Hodges and Greer Baughman, Richmond, were elected as members of the staff.

Dr. C. D. J. MacDonald has been appointed Coroner of Norfolk, succeeding Dr. J. Judd Miller, deceased.

Dr. Beverley R. Tucker, Richmond, has been elected Vice-President of the Westmoreland Club.

Dr. James Rawlings, Staunton, has been appointed a member of the State Board of Health.

Dr. R. L. Kern, Richmond, has been named Senior Warden of the Libertas Lodge of Perfection, No. 5, Ancient and Accepted Scottish Rite of Freemasonry.

At the annual convocation of the Grand Lodge of Virginia, A. F. and A. M., Dr. E. A. Drum, Richmond, was elected a member of the Board of Governors of the Masonic Home. The following were elected Deputy Grand Masters: Drs. G. F. Simpson, Purcellville, C. F. Rinker, Upperville, W. D. Prince, Stony Creek, and J. L. Early, Saltville.

An appropriation of $30,000 a year additional has been adopted by the Senate for the Medical College of Virginia, Richmond.

(Continued on page 50)

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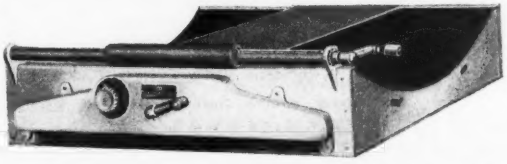

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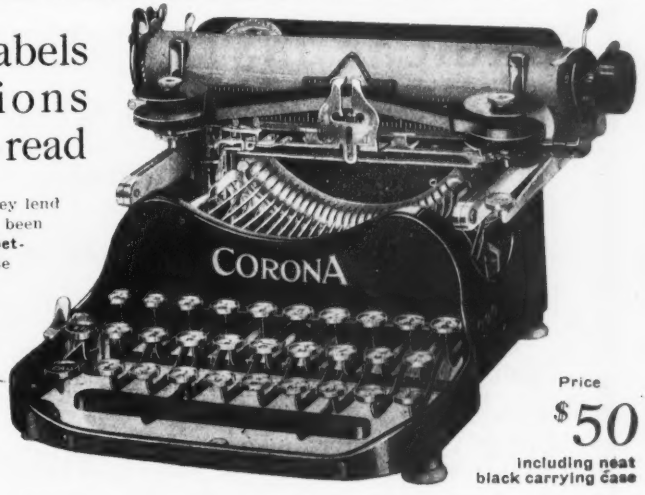

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253 WESTERN AVE. BOSTON, MASS

(Continued from page 58)

Dr. Giles B. Cook, Front Royal, has been elected President of the recently organized Dramatic Club.

Dr. William B. Hopkins, Richmond, has been elected Grand Senior Master of the National Omega Upsilon Phi Fraternity.

Drs. J. Shelton Horsley, Garnett Nelson and William H. Parker have been appointed members of the Committee on Health and Sanitation of the Richmond Chamber of Commerce.

Dr. Zebulon Vance Sherril and Dr. Carolyn A. Clark, both of Marion, were married February 9.

Dr. William Marco Sheppe, University, and Miss Olive Bow Harris, Albermarle County, were married February 22.

Dr. John M. Henderson and Mrs. Martha Spencer Warburton, both of Williamsburg, were married February 28.

Dr. William A. Lucas, Pulaski, and Miss Mary Trent, Knoxville, Tenn., were married March 1.

Deaths

Dr. Alfred S. Rixey, Culpepper, aged 61, died February 28.

Dr. Reuben Thomas Ramsey, Gretna, aged 64, died February 28.

Dr. J. Judd Miller, Norfolk, aged 50, died February 20 from lymphatic leukemia.

Dr. William Hall Thomas, Steele's Tavern, aged 63, died March 11 from cerebral hemorrhage.

WEST VIRGINIA

Dr. Theodore K. Oates, Martinsburg, has erected a three-story building for the purpose of organizing a group clinic.

Dr. C. E. White, Superintendent of the Weston State Hospital for the Insane, has resigned.

Deaths

Dr. Eugenius Augustus Hildreth, Wheeling, aged 41, died March 11 at the Ohio Valley General Hospital from pneumonia.

Dr. Harvey Bowers, Sugar Grove, died March 2 from pneumonia.

Dr. Reed McColloch Baird, Wheeling, aged 64, died February 28 at the Ohio Valley General Hospital from paresis.

Dr. James Renick Kincaid, Frankford, aged 67, died January 11 from pernicious anemia.

SURGICAL INSTRUMENTS

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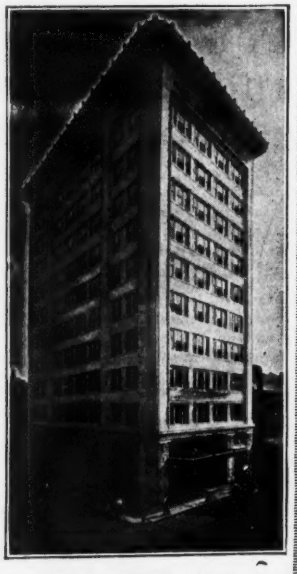

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MORE people die from pneumonia than any other disease.

Approximately 25 out of every 100 cases end fatally. Dr. Gustav Goldman has demonstrated that at least twenty of these twenty-five deaths may be prevented by employing Bacterial Vaccines. Why delay and chance a fatal termination?

Dr. Gustav Goldman's article appeared in American Medicine, March, 1921

Bacteriological Laboratories of

G. H. SHERMAN, M. D.
DETROIT, U. S. A.

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So writes a physician regarding a new way he had discovered for introducing a filiform into the bladder in cases of tight stricture. His experience, together with a multitude of others equally interesting and stimulating, make up one of the features of

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Sterile, Accurate, Efficient. In Hypule Form

Sodium Cacodylate, Mercury Biniodide, Mercury Salicylate, Iron Citrate, Iron Citrate and Sodium Arsenate, Emetine Hydrochloride, Fisher's Solution (concentrated), Gray Oil, Novocain and 80 other formulae.

Heisters Hypules

These hypules not only insure full potency and exact dosage of the drug to be administered, but they afford the physician an aseptic, and readily assimilated solution or suspension. For treatment in serious and malignant diseases, hypodermic medication is far superior to the indirect methods of absorption through the alimentary tract. The use of HEISTER'S HYPULES places this form of medication on a scientific basis, relieving the practitioner of all anxiety as to the quantity or character of the hypodermic injection which he administers.

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Summer Diarrhoea, Fermentative Diarrhoea, etc.

PROTEIN MILK is used in a large number of hospitals and by pediatricians in their private practice to correct diarrhoea in infants. Its value has been fully demonstrated by its use over a period of years.

Formerly the preparation of Protein Milk in the home was complicated as well as expensive, which interfered with the doctor's orders being carried out.

MEAD'S CASEC

A new preparation, known as **CASEC,** has been perfected by **MEAD,** which makes it possible to do away with the complicated side of preparing Protein Milk. The ease with which Protein Milk can be prepared with Casec has made it practical and widened its use, and now physicians, nurses and mothers may prepare Protein Milk with Casec with the same ease and accuracy as the preparation of any other milk modification in the home.

MEAD'S CASEC is a calcium-caseinate product, prepared from the casein of fresh skimmed milk.

Full description, analysis and directions for use will be furnished upon request.

MEAD'S DEXTRI-MALTOSE for average infant feeding.

THE MEAD JOHNSON POLICY

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MEAD'S CASEC for babies with diarrhoea.

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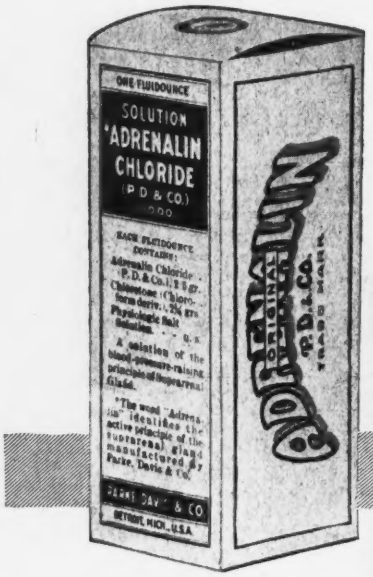

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